IN THIS ISSUE—WAR TRUCK DEFECTS

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The AUTOMOBILE

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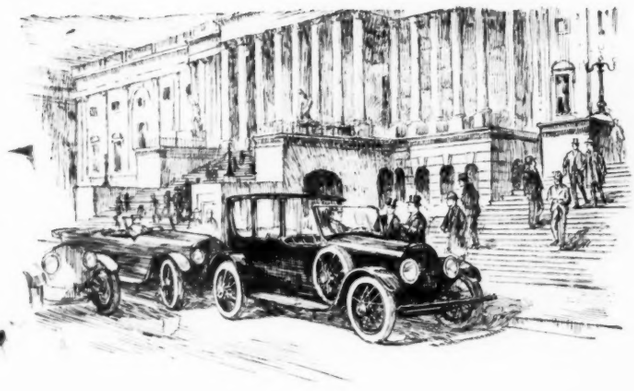

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Editorial Contents, page 3

Advertisers' Index—Next to last page

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The AUTOMOBILE

VOL. XXXVI NEW YORK—THURSDAY, MAY 3, 1917—CHICAGO No. 18

Oppose Unjust Taxation!

Entire Industry Should Oppose Proposed 5 Per Cent Tax on Car Sales at Factories—Industry Willing to Give Its Share of War Taxes But Such Class Taxation Is Unfair—Tax Cannot Be Passed to Consumer To-day

WASHINGTON, May 2—The proposed tax of 5 per cent on the total sale of automobiles by the manufacturers, which has been put forward as one of the taxation measures to raise $1,800,000,000 war funds, is being opposed by the automobile makers and the industry in general on the ground that this particular form of tax is class legislation and takes the form of a poll tax on a percentage of the people. It has been suggested by certain Washington officials that should the tax become a law it might possibly be declared unconstitutional on these grounds.

Industry Will Pay Its Share

As soon as war taxation measures were proposed the automobile industry expected to stand its share of just inequitable taxation and is prepared to do so to-day, but this particular 5 per cent tax which manufacturers must pay on the selling price of each car is considered grossly unfair by the leaders of the industry and as a consequence the entire industry should unite in opposing the progress of the measure through Congress and the Senate.

Latest reports from Washington indicate that the inability of the House Ways and Means committee to agree on the provisions of the war revenue bill is resulting in a deadlock. One of the most important factors in this situation is the proposed 5 per cent tax on automobiles.

Alfred Reeves, general manager of the National Automobile Chamber of Commerce, has been in Washington to aid in protecting the automobile manufacturers in this matter. The question is now before a sub-committee of the Ways and Means Committee of the House. This sub-committee will make its report to the Ways and Means Committee, which may be done any day.

The Ways and Means Committee of the House will have to approve the measure as a whole or by a majority. This done, the bill is then brought before the House of Congress.

If passed by Congress, the bill then goes to the Finance Committee of the Senate, which has Senator Simmons of North Carolina as chairman, and he cannot be considered in any sense a supporter of the automobile industry in this matter. The automobile industry has one favorable representative on the Senate Finance Committee in the person of Senator Townsend of Michigan, who, it is expected, will look after the interests of the automobile industry to see that grave injustices are not done it in this matter.

Once out of the Senate Finance Committee, the measure next goes to the Senate for the vote.

Write Your Congressman

Every automobile manufacturer and every automobile dealer and garageman should immediately do his part in opposing this 5 per cent tax on automobiles at the factory. The only way to register such opposition is to write your Congressman, opposing the measure on the ground that it is class legislation.

The automobile industry feels positive that it is not possible to pass this 5 per cent tax on to the consumer as it is generally supposed will be done. This is no time for such action. Such a course might have been followed when prices of tires were being reduced, but to-day, when an $800 car is selling for $1,050, there is no possible chance of passing an additional 5 per cent on to the consumer.

There could be no more unfortunate time to have the price of automobiles increased than at the present. Already retrenchments are being made in the purchase of automobiles throughout the country. Thousands of owners of used cars who contemplated buying new ma-

(*Continued on page* 860)

$160,000,000 for War Transportation—$3,900,000 Additional for Armored Cars

Large Government Appropriation Reported—$5,539,965 for Military Roads, Etc.—Advice from Allies' Officers—Long Service Expected—Acid Test for Motor Vehicles

WASHINGTON, May 1—The first great war budget, a bill making available $2,699,485,281.18 for the estimated cost of the first year of the war with the German Government. was reported yesterday by the Appropriations Committee. Of this sum, $160,000,000 is set aside for transportation purposes alone, from which the principal allowances for trucks and automobiles will come.

Armored cars will receive $3,900,000 additional, $750,000 additional is appropriated for anti-aircraft guns and $1,640,000 for ammunition for the latter.

Special attention is to be given the matter of military roads by the War Dept. Roads, walks, wharves and drainage alone will receive $5,529,965. The greater part of this will be spent for roads.

For transportation and recruiting of the Marine Corps, $1,731,600 is provided. For the immediate purchase and equipment of sites for the permanent establishment of aviation schools, aviation posts and experimental aviation stations and proving grounds $9,000,000 is made available, $2,500,000 of which may be used in purchasing land.

Money for Airship Repair

The sum of $47,267,766 has also been appropriated for the office of chief signal officer. For the purchase, manufacture, maintenance, operation and repair of airships and other aerial machines and accessories necessary in the aviation section, $43,450,000 has been set aside. This money will also be used for the maintenance of automobiles and equipment-carrying vehicles for the aviation section.

In addition to the amount provided in the bill for aviation activities, the sum of $11,000,000 is provided for aviation in the navy. Numerous small items for motor vehicles are also included in the bill.

The experiences of Great Britain and France with heavy motor apparatus are being drawn upon in connection with plans in the making for the best possible utilization of these factors by the War Dept. These plans, on which experts of the army officers assigned for duty in connection with the Council of National Defense heads are engaged, include the adaptation of motor trucks, tanks, armored cars of different designs, etc., to the varied uses and conditions which will confront the army once it is in the field. In fact, every possible contingency is being provided for insofar as this is possible.

Plans are being made upon the theory that the increased army will see extreme service and under extreme conditions. In the making of these plans valuable suggestions are being obtained from English and French army officers now in this country with the British and French commissions. The acid test is to be given every piece of motor apparatus bought by the government.

English Aeroplanes for Commercial Purposes

LONDON, April 26—Great Britain is planning to use aviation in trade. This announcement was made in the House of Commons to-day by Major J. L. Baird, representative in the House of the Aerial Advisory Board. The Government has decided to appoint a committee under the chairmanship of Lord Northcliffe to investigate civil aerial transport after the war.

This committee would consider and report on steps to be taken for the development and regulation after the war of aviation for civil and commercial purposes from domestic, imperial and international points of view, and the extent to which it would be possible to utilize the trained personnel and the aircraft which at the conclusion of peace would be available.

The output of aeroplanes has been increased greatly during the last few months, and a greater increase is expected. Taking the monthly average output for the last year as the imaginary figure of eight, the output for the first 2 months of this year would be represented by sixteen, and it is expected that by the end of the year it would be represented by thirty-eight.

How Allies Fight in Air

WASHINGTON, D. C., April 30—The British and French flying corps are in complete control of the air over the Western front, according to Major L. W. B. Rees of the British flying corps. In describing the maneuvers of the battle squadrons, Major Rees said that the British fly on three levels with three kinds of machines. The lowest are the artillery directors, who circle about in big figure eights about 600 ft. above the enemy trenches and flash back directions to the British gunners by wireless. Above them, at 10,000 ft., are the heavy fighters with two men to a machine and able to keep the air for 4 hr. at a speed of 110 m.p.h. At a height of 15,000 ft. are the single-man light fighters, capable of 130 m.p.h. and of ascending the first 10,000 ft. in 10 min. British losses above the foe's lines have reached thirty to forty machines a day.

Waldon and Hutton Plan Aeroplane Output

DETROIT, May 1—It is reported that Sidney D. Waldon, former chief engineer of the Packard Motor Co. and William H. Hutton, former purchasing agent of the Timken-Detroit Axle Co., have arranged with competent builders for the government to obtain aeroplanes at the rate of 640 in 1917, 2400 in 1918, and 5500 in 1919.

To Examine Joy Field

DETROIT, May 2—Major Benjamin Foulois of the Aviation Corps will examine the Joy field, which the war department has practically decided to acquire.

Automobile Men Receive Commissions

WASHINGTON, May 2—Henry Souther, past-president of the S. A. E. and recently consulting engineer, Office of the Chief Signal Officer in the War Department, is to be commissioned a major in the aviation corps.

S. D. Waldon, formerly connected with Packard and Cadillac and for some time past active in government aviation work, has been commissioned a captain in the aviation section of the Signal Corps.

W. H. Hutton, former Timken-Detroit Axle Co. purchasing agent, has been commissioned a major in the quartermaster's department, where he will probably have to do with the inspection and purchase of motor trucks. S. P. Wetherill, Jr., administrative and chemical engineer, has also been made a major in the same work as Mr. Hutton.

New Six-Cylinder Abbott

CLEVELAND, May 1—The Abbott Corp. is adding a six-cylinder model called the 6-60 using the 7-N Continental engine and Warner transmission. Prices are as follows:

Seven-passenger touring	$1,595
Four-passenger roadster	1,595
Two-passenger speedster	1,595
Four-passenger Springfield, inclosed	2,100
Five-passenger sedan	2,150

Features of the car are a mahogany cowl, nickeled copper instruments, front and rear bumpers and Boyce Moto-Meter as standard equipment. A 5½ in. frame will be used.

5 Per Cent Automobile Tax

Read the article "Oppose Unjust Taxation!" appearing on page 845 of this issue which tells why you should oppose this class taxation. After reading it do your part by writing your congressman in Washington, registering your opposition to this tax on the ground that it is class taxation.

Auditorium for S. A. E. Meeting

Bureau of Standards Offers Facilities for Summer Session —Informal Dinner June 26

WASHINGTON, D. C., May 1 — The Bureau of Standards, under the direction of Dr. Stratton, has advised that its auditorium and other necessary parts of the bureau will be at the disposal of the Society of Automotive Engineers for its Summer Meeting, Monday and Tuesday, June 25 and 26. The bureau has been co-operating with the society in many ways connected with standardization work and this courtesy is another example of how desirous the Government is to work with the engineers.

The meeting on Monday, June 25, will be given over entirely to the work of the Standards Committee.

Tuesday, June 26, will be occupied by the general work of the society, including a business meeting in the morning, receiving of reports, and professional papers in the afternoon.

F. E. Moskovics has accepted the chairmanship of the committee for the informal dinner Tuesday evening, June 26. The exact place at which this dinner will be held has not yet been decided upon. Mr. Moskovics is in the city this week arranging for the dinner and adding to his committee to handle this work.

—

S. A. E. Starting and Lighting Committee Named

DETROIT, April 27—Members of the starting and lighting batteries division of the standards committee of the Society of Automotive Engineers, of which G. E. Goodard, assistant engineer Dodge Brothers, is chairman, include W. H. Palmer, Electric Storage Battery Co.; W. H. Conant, Gould Storage Battery Co.;R. J. Nightingale, Willard Storage Battery Co.; J. V. Whitbeck, Chandler Motor Car Co.; R. H. Combs, of the Prest-O-Lite Co., and W. L. Bliss, of the United States Lighting & Heating Corp.

—

Vital Mfg. Co. Now

CLEVELAND, April 28—The Vital Mfg. Co. is the new name of the Bigsby Rotary Mfg. Co. The concern produces a spark plug.

—

Hinkley Heads Detroit S. A. E.

DETROIT, May 2—At a meeting held last night of the Detroit section of the Society of Automotive Engineers, C. C. Hinkley, chief engineer of the Chalmers Motor Co., was elected chairman; F. H. Whitten, chief engineer of the General Motor Truck Co., vice-chairman; W. B. Stout, aircraft engineer of the Packard Motor Car Co., secretary; G. M. Holley, Holley Brothers, treasurer; O. E. Hunt. chief engineer of the body division of the Packard Motor Car Co., chairman of the meetings committee; W. H. Oliver, Jr., Chalmers Motor Co., chairman of membership committee; C. Van Sicklen, Van Sicklen Speedometer Co., chairman of ways and means committee, of which there are three divisions:

Social Division, chairman, H. A. Brown, Hyatt Roller Bearing Co.
Publicity Committee, chairman, B. G. Koether, Hyatt Roller Bearing Co.
Sections Meeting Committee, chairman, H. E. Butcher, manufacturers' representative.

Mr. Hinkley has introduced a new plan for securing papers which will insure important and valuable information to the members of the organization by the inauguration of an industrial research committee, H. M. Jerome, Chairman, which has five divisions. These are: R. H. Sherry, chief chemist of the General Motors Co., chairman of mechanical and metallurgical research; F. M. Holden, Cadillac Motor Car Co., laboratory testing; H. M. Jerome, Chalmers Motor Co., chairman of inspection; George C. McMullen, Timken-Detroit Axle Co., chairman of planning and mechanical efficiency; Paul E. Kelecon, Cadillac Motor Car Co., chairman of body design.

—

British and French Engineers Appreciate S. A. E. Co-operation Offer

NEW YORK, May 2—Some days ago the Society of Automotive Engineers forwarded a cable to the Institution of Automobile Engineers in England and also to the Automobile Club of France offering assistance by way of tractor information, etc., in connection with the present food conservation problem. A reply has been received from Basil H. Joy, Secretary of the Institution of Automobile Engineers, London, thanking the society for its offer and soliciting the co-operation of the S. A. E. in the quicker production of farm tractors for Great Britain and also in many other matters with regard to same.

The cable forwarded by the S. A. E. follows:

"The Society of Automotive Engineers, formerly Society of Automobile Engineers, extends its congratulations to the Automobile Club of France (Institution of Automobile Engineers) on its able service in assisting its Government in motor transportation and kindred activities. We consider the farm tractor one of the most potential elements in solving the food problem. Our membership includes tractor engineers of all leading manufacturers, much tractor experience and information is at our command, and in extending our brotherly sympathy and co-operation in the common struggle for democracy we formally place all our data at your disposal and would be honored to collaborate in any way you desire. Standardization in farm tractor manufacture as well as in airplane and motor boat manufacture is being pushed vigorously and other activities are being forwarded aggressively. Command our assistance as you desire in the food increase work."

—

500 New S. A. E. Members

NEW YORK, May 2—Whether the Society of Automotive Engineers succeeded in obtaining 1000 new members during its April campaign, is not yet known. To date 484 applications for membership have been received, but unquestionably several hundred are being circulated for the necessary number of signatures and will not reach the office for some days. It will be perhaps the middle or near the end of May before the exact success of the campaign is definitely known.

S. A. E. Insures Close Co-operation

Washington Office to Keep in Touch with Government— Members at Capital

WASHINGTON, May 1—Arrangements are practically complete for the Washington offices of the Society of Automotive Engineers in the Munsey Building, where it will be conveniently located with regard to the Council of National Defense. Howard E. Coffin, past-president of the society, and one of the leading activity centers of the Council of National Defense, has the matter under his direction and it is certain the society will be well cared for.

K. W. Zimmerschied, past-chairman of the Standards Committee and metallurgist, General Motors Corp., is spending practically all of his time in Washington, and it is expected will have complete charge of the Washington office. It is expected that many other members of the Society who are spending a good deal of time in Washington will cooperate so that the office will be a real information center for S. A. E. members.

President George W. Dunham, owing to his appointment on the board for the development of automotive apparatus for moving field artillery, will spend a good deal of time in Washington. Coker F. Clarkson, general manager of the S. A. E., also expects to spend much time in Washington. S. D. Waldon has been making headquarters with the Council of National Defense for some months and can assist. The Washington office should prove a particularly popular center.

Through it the Society aims to keep in very close touch with not only the War and Navy departments. but also the department of Agriculture, which is deeply interested in the farm tractor.

The office will continue to give special attention to the standardization of products vital to the present war, to the work of the motor transport committee, and to other important activities of the Government.

Howard E. Coffin, discussing the work which the S. A. E. has done in assisting in preparations for the conduct of the war, said the value of this assistance to the Government could not be overestimated. The wide experience and great technical knowledge of the S. A. E. membership has been put in command of the Government freely, practically without condition, to the great benefit of the nation and, according to Mr. Coffin, no other organization will be found giving more cheerfully of its efforts during the war to greater advantage to the Government than the S. A. E.

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Wins Argentine Parade Prize

ROSARIO, ARGENTINA, March 30—J. M. Johnson, Studebaker dealer in this city, won first prize for the best decorated automobile in a large parade held here recently.

Standards Committee Meets

Research Division Reports on Acceleration Tester—Aero Division Progressing

CLEVELAND, May 2—The meeting of the various divisions of the Standards Committee of the Society of Automotive Engineers started here to-day and to be continued to-morrow, is not as largely attended as was anticipated on the opening day, but it is expected that the attendance to-morrow will be much larger.

One of the most important reports presented is that of the Research Division relating to new apparatus for testing acceleration of automobiles.

It consists of an ignition breaker fitted on front wheel and paper strip moved by chronometer marking seconds. Each revolution of the wheel causes five sparks which puncture paper. Counting punctures for any second shows speed of car. It is expected this much discussed car testing report will be accepted.

Good progress has been made by the Aeronautic Division under the chairmanship of Charles M. Manly of the Curtiss company. Among the many recommendations decided upon by this division are the following:

A. The adoption of two types of control, the Deperdussin and the stick type, providing it meets with the approval of the army and navy.

B. The use of clincher rims for airplane wheels conforming to the standards of the Clincher Automobile Tire Manufacturers' Assn., the rim sizes to be 24 by 3½, 28 by 4, and 32 by 4½. Tires of corresponding sizes are to be used.

C. Marking of fuel and oil pipe lines, fuel lines with red stripes ½-in. wide painted around the pipes and 24 in. apart; and oil lines with circular white rings ½-in. wide and 24 in. apart.

D. The use of the English system of measurement in aeroplane matters except in such isolated cases as spark plug threads where the metric system is desirable. This action is due to the fact that the army and navy departments are not both in favor of adopting the metric system.

E. The following spark plug dimensions: Thread, 18 mm., 1½ mm. pitch. The hexagon is to be 1 in. across flats.

F. Engine rotation to be defined as: "The direction of engine rotation is normal when the final power delivery member of the engine rotates anticlockwise, viewed facing the power delivery end. Opposite rotation is anti-normal."

G. Approval of the following S. A. E. standards for aeronautic practice: Steel specifications, heat treatments, test specimens, ball bearing sizes, throttle levers, magneto dimensions, cotter pin sizes, and screws and bolts.

H. Many other standards relating exclusively to aeroplane practice were approved, including flexible cable ends, spliced, non-flexible ends, thimbles, turnbuckles, pipe fittings, propeller hubs, etc.

The Chain Division recommended that designers of silent chain drives should use the exact nominal pitch of the chain in computing center distances for sprockets. It also recommended standards for designating width of silent chains as the width of over-all tension members, and that the maximum width of the chain over riverheads shall be this nominal width plus ½ the pitch.

The Electric Equipment Division has prepared proposed standards for flanged mountings of electric generators and starting motors. It is not intended that this type of mounting shall be standardized to the exclusion of other mountings.

The Engine Division has collected data on poppet valves which has been submitted to manufacturers for the purposes of recommending standardization on some of the major dimensions of the valves.

The work of the new Marine Standards Division has been pushed along with the result that the division has recommended the adoption of a host of S. A. E. standards for marine practice. The list includes:

Adjustable yoke rod ends; plain yoke rod ends; eye rod ends; yoke and rod end pins; cotter pins; spark plug shells; screw standards up to 1½ in.; screw thread tolerances; tap drills; large diameter screw thread; lock washers; square broached fittings; six-spline fittings; ten-spline fittings; four-spline fittings; carbon steels; screw stock; steel castings; nickel steels; nickel chromium steels; chromium steels; chromium vanadium steels; silico-manganese steels; heat treatments; bearing metals; phosphor bronze; brass casting metals; manganese bronze sheets and rods; hard cast bronze; gear bronze; aluminum alloys; brass sheets and strips; brass rods; tobin bronze rods; non-ferrous metal tubing; round tension test-specimen; flat tension test-specimen (standard); flat tension test-specimen (alternate); shock test-specimen; gray iron test-specimens; Brinell hardness test; cold drawn seamless steel tubes; bands and strips; roller bearings; carbureter flanges ½ to 2 in.; carbureter flanges 2½ to 3½; flared tube unions; gasoline pipe sizes; flared tubes, ells and tees; throttle levers; throttle lever throw; carbureter air heater; magneto dimensions; tire-pump base dimensions; electric bulb bases, sockets and plug ends; location of engine number; oversize cylinders; piston-ring grooves; storage battery directions; electrical insulation requirements; flexible steel tubing.

The Tire and Rim Division have finally submitted standards for demountable rims for military trucks. These standards appear to be highly satisfactory. The division has suggested special designs which make the layout of wedge rings and side flanges much more simple than those proposed by the Quartermaster's Department. One type of wedge ring will serve for all single and dual tires of whatever sectional size, and only one section of center wedge ring is needed for all widths of dual tires. All side rings are also reduced to one type which may be used for inner or outer flanges of single or dual tires.

Prest-O-Lite Trade Mark Upheld

Court of Appeals Reverses Previous Decision—Prest-O-Lite Not Generic Term

ALBANY, N. Y., May 2.—The term Prest-O-Lite is a legitimate trade mark and the Prest-O-Lite Co., Indianapolis, is entitled to protection in regard to its use, according to the decision of Judge Crane of the Circuit Court of Appeals of the State of New York.

This is the final decision in the suit brought by the Prest-O-Lite Co. against Frederick Ray, F. Arthur Haines and Daniel R. Smith, doing business as Smith & Haines, early in 1913, charging violation of the trade mark law of New York, which imposes a penalty of $100 on any person violating the following regulation:

"Any person or corporation engaged in manufacturing, packing, bottling or selling any article of merchandise, put up by him, for sale of any bottle, vessel, box, package or other receptacle, with his name, trade mark, label, or private mark appearing in any way thereon, or branded, stamped, affixed, blown or impressed thereon may file in the office of the Secretary of State and in the office of the County Clerk."

Smith & Haines were alleged to have sold one of the Prest-O-Lite Co. containers marked with the label Prest-O-Lite and filled with acetylene gas manufactured by the Searchlight Gas Co. Suit was brought in the Municipal Court, where judgment was rendered in favor of Prest-O-Lite, this being affirmed by the Appellate term. The Appellate division of the Supreme Court, however, reversed the decision and dismissed the complaint on the ground that Prest-O-Lite had become a generic term, indicating the article of manufacture, irrespective of its makers, and therefore not the subject of a trade mark.

In reversing the decision of the Appellate division Judge Crane pointed out the exchange system established by the Prest-O-Lite Co. clearly connected the word Prest-O-Lite with the manufacture and established business methods of the Prest-O-Lite Co. The court also found the fact that the Prest-O-Lite had but a limited license from the owner of the patent, the Commercial Acetylene Co., an important factor in the situation.

—

Goodyear Holds Positions Open

AKRON, May 3—The Goodyear Tire & Rubber Co., in an effort to stimulate enlistment, will hold the positions open for those enlisting until their return at the expiration of their terms of enlistment.

Write Your Congressman

Do not let to-day pass without writing your Washington congressman protesting to him against the levying of the 5 per cent tax on automobiles at the source of manufacture. The article on page 845 tells all about it.

Enroll 40 Truck Train Crews

Four-Year Enlistment in Quartermaster Enlisted Reserve Corps for 1360 Drivers

NEW YORK, May 1—The Quartermaster Corps, Department of the East, through orders issued from Washington and transferred through Major Frank H. Lawton, is now in the field for crews to man forty motor truck trains for army work. The Motor Truck Club of America will do a large share of the work.

There men are to be recruited into the Quartermaster Enlisted Reserve Corps and will enlist for a 4-year period with but 15 days' compulsory service yearly, if so ordered. They will not be called to active service for the government until such time as an emergency arises. As thirty-four drivers are to be recruited for each truck train, the total number to be secured will be 1360.

This work will be carried on in Boston and this city through committees. Other committees are now in the course of formation in Philadelphia and Atlanta, Ga. The New York committee will undertake to carry on the work in the States of New York, Pennsylvania, New Jersey, Maryland, Virginia and West Virginia.

A similar committee has been formed in Boston to obtain recruits in the six New England States which will form the Northeastern Department of the present Department of the East.

The Southeastern Department will include North Carolina, South Carolina, Georgia, Florida and Alabama. Headquarters are at Atlanta.

It is not the intention of the various committees to recruit drivers solely from the ranks of present-day drivers, as that procedure would seriously cripple the present industrial transportation life in the localities from which such men were taken. It is rather the intention to obtain enlistments from among the ranks of those who own or drive their own cars and from college graduates who could be made into drivers of the highest class after a short period of training.

The truck drivers are enlisted as sergeants instead of privates. An enlistment station for the Department of the East has been located at Governors Island, but will be moved to the United States Rubber Co.'s building at 1790 Broadway, New York, where application blanks may be had. Other recruiting stations will be opened at Philadelphia, Washington, Buffalo, Rochester, Syracuse and various cities throughout the entire present Department of the East.

Applicants for enlistment as truck drivers must be between the ages of 18 and 45. They will be examined by a special examining board. They will be required to keep themselves physically fit for military service for a period of 4 years and to attend each year, if ordered to do so, an army encampment for 2 weeks only, for which duty they will be paid. Men who enlist in this reserve retain their status as civilians and are only required to leave their homes to attend an encampment in time of war or threatened war.

Truck drivers in the Enlisted Reserve Corps will receive $36 a month, and will have their railroad fares and general expenses paid. They will be supplied with uniforms the same as enlisted men of the Quartermaster Corps of the regular army reserve, except for insignia.

—

Colleges for Aviation Training

WASHINGTON, D. C., May 2—Following a conference here between the Aeronautic Division of the Council for National Defense and a number of heads of colleges throughout the country, the following institutions have been designated as training schools for army aviators: Cornell University, Illinois State, Ohio State, California State and Texas State Universities, and the Massachusetts Institute of Technology.

The War Department will order practical aviators to each of these institutions as instructors to assist three faculty members from each university who will be detailed as instructors. In the meanwhile each of these universities will send its three faculty members to study practical aviation problems at the Canadian Training School, connected with the University of Toronto.

The Ohio State University has made arrangements to use a string of ten aviation fields being established between Columbus and Dayton by a Dayton aeroplane company. The two cities will be terminals of a regular flying course.

The Signal Corps has selected ten sites for aviation training camps, the greater part of which will be opened by July 1. The location of these camps is not yet announced.

—

Goodrich Officials Buy War Bonds

AKRON, May 3—More than 100 Goodrich officials have signed pledges to take war bonds and hundreds of minor employees have signed to take at least one bond each.

Class Taxation

The 5 per cent war tax on automobiles sold from the factory as proposed by the subcommittee of the Ways and Means Committee in Washington should be opposed by every reader of THE AUTOMOBILE on the ground that it is class taxation. We all stand ready to pay our share of the $2,000,000,000 war taxes required each year. We will cheerfully do whatever we are called upon, providing it is equitable in relation to other industries, but we are unalterably opposed to such class taxation as this 5 per cent tax is.

Industry to War on 5% Tax

N. A. C. C. and Accessory Manufacturers Urge Members to Wire Congressmen

NEW YORK, May 3—The entire automobile industry, including automobile, parts and accessory manufacturers, is being marshalled in opposition to the 5 per cent war tax on automobiles at the source of manufacture by the two national organizations, the National Automobile Chamber of Commerce and the Motor and Accessory Manufacturers. Both of these organizations have wired their entire membership asking them to wire Congressmen and Senators at Washington protesting against the 5 per cent tax because of its being discriminatory and class legislation, but also expressing a complete readiness to share an equal burden of war taxation with all other industries, and favoring the excess profit tax as modified to meet war needs.

Although the telegrams have been out but a short time, both the N. A. C. C. and the M. A. M. are already flooded with replies from members in which all of them are unanimous in favoring the excess profit tax, but strenuously opposing the 5 per cent tax on automobiles at the source of manufacture.

The complete telegram sent out by both organizations is:

"War creating critical situation, workmen being laid off, production being curtailed. Official Washington says that Federal tax on automobiles in use is unconstitutional and therefore a special war tax of 5 per cent on the factory sale price of cars is proposed by the subcommittee of the Ways and Means Committee which has the drafting of such a measure in hand. It is impossible to charge this extra tax to consumers in view of increased prices now paid. In co-operation with (N.A.C.C.) (M.A.M.) please wire and have others wire Congressman ————, Washington, expressing readiness to share full and fair taxation, but protesting against discrimination aimed at automobile industry. Washington officials are judging the automobile industry by the great prosperity of a few rather than the average of the many, despite the fact that hundreds of firms have failed in the past 5 years. Such unconstitutional tax, with other burdens of increasing cost, and declining markets would seriously affect allied industries. We endorse excess profit tax on all industries."

Over half of the membership of the N. A. C. C. have responded favorably and it now seems certain that there will be a recast of the taxation scheme by the sub-committee of the Ways and Means Committee because of the strong and very general opposition by the automobile, accessory and parts industries.

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Sweet Back from Europe

GRAND RAPIDS, MICH., May 3—George Sweet, vice-president of the United Motors Co., returned yesterday from Europe.

Factory Activities

OAKLAND, CAL., April 30—The Fageol Motors Co. will establish a motor truck factory in Oakland and the company will produce a new type of truck. The first allotment will be for 150 trucks, ranging in size from 2 to 5 tons, and it is expected that deliveries will begin July 1. The first unit of the factory will be 50 by 250, concrete and steel. The Fageol company became prominent several months ago through the announcement of the highest-priced passenger car chassis—a design fitted with a Hall-Scott aviation motor. Later the company withdrew from the passenger car field temporarily to permit government use of the entire Hall-Scott production.

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MILWAUKEE, WIS., April 28—Ground was broken to-day by the Wisconsin Motor Mfg. Co. for a huge machine and assembling shop addition, 115 by 275 ft. The concern recently increased its capital stock from $350,000 to $1,000,000 to provide for the extensions and the growth of the business. The new facilities will be available about July 1, it is expected.

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WINDSOR, ONT., April 27—The Ford Motor Co. of Canada, London, Ont., will build a plant costing $150,000. It plans to install a complete plant for enameling automobile bodies, including large ovens.

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DETROIT, April 28 — The Chalmers Motor Co. has purchased 6 acres of factory land from the City of Windsor, Ont., and will begin the erection of a two-story factory next week. This building will replace the one recently destroyed by fire.

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DETROIT, April 28—The City of Windsor, Ont., is negotiating with the Saxon Motor Car Corp. for the sale of a factory site in Windsor.

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MOUNT BRYDGES, ONT., April 26—The Crow Motor Co. will erect a plant at London, Ont., to cost $100,000.

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PHILADELPHIA, April 27—The plant of the S. S. E. Co. is completed and will soon be in readiness to make $5,000 chassis. Victor Lee Emerson, president of the company, states that although nothing will be turned out for several months, the plant is sold ahead for 1 year.

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PLAINFIELD, N. J., April 28—The American Motors Corp. has removed its advertising department to the Springfield factory.

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YOUNGSTOWN, OHIO, April 27—The Republic Rubber Co. is contemplating building additions to its plant. Engineers have been engaged on plans for the additional buildings for some time. Some of the buildings will probably be erected on the 40-acre tract which the company owns on the east side of Albert Street extension. It is proposed to at least triple the present capacity of 3000 tires a day. Extensions will also be made to increase the output of mechanical rubber goods.

The company also plans to contribute its share toward solving the housing problem in this city, and will erect a number of modern dwellings on Republic Avenue, near the plant.

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POTTSTOWN, PA., April 27—The North American Motors Co. will soon start on the construction of its new plant. The building will be 302 by 72 ft., and will be located at Queen and Bailey Streets.

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DETROIT, May 2—Packard has placed an order for 3000 truck radiators to be delivered by June 30. The company usually buys 200 radiators per month.

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WATERTOWN, WIS., April 28—The Morgan Screw Corp., Newport, R. I., is negotiating with a committee of business men and capitalists of Watertown, with a view of relocating its plant and headquarters in that city. The company asks local capital to take a $50,000 interest by stock subscription. It agrees to dispose of its present plant in Newport and move the equipment, valued at $69,000, to Watertown, where a new plant employing 100 will be established if a suitable building is provided at a reasonable rental with option to purchase. It is stated that the company has from $85,000 to $100,000 worth of unfilled contracts, mainly from automobile manufacturers.

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MILWAUKEE, WIS., April 28 — The Evinrude Motor Co., Milwaukee, Wis., rowboat engines, and one of the largest producers of these engines, has purchased a 10-acre tract of land as a site for its new plant, to cost about $250,000 complete. The Evinrude company will engage in the manufacture of engines for farm and general utility purposes, these being designed to use kerosene and the heavier distillates of petroleum as fuel, but will continue to make rowboat engines. The present plant at 279-281 Walker Street, Milwaukee, will be abandoned upon the completion of the new works. Contracts will be awarded about May 28 for the erection of the new group, the main buildings of which will be a machine shop, 300 by 300 ft., and a gray iron foundry, 80 by 200 ft., with a 60-in. cupola. A brass foundry unit also will be provided.

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PHILADELPHIA, April 27—The Atwater-Kent Mfg. Co. has awarded a contract for the erection of a two-story building at Logan and Stenton Avenue. The building will measure 14 by 217 ft. and will cost $75,000.

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GREENVILLE, MICH., April 28—The Tower Motor Truck Co., recently organized by local capitalists, has just started operations in its new plant here, and expects to be turning out 100 machines this year. The building is fireproof, 60 by 220 ft.

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LOGANSPORT, IND., May 1—Work was started yesterday on the construction of the buildings for the Revere Motor Car Co., which will assemble the Revere car, using a Duesenberg engine. The buildings will have a floor space of 33,000 sq. ft., and the plant will have a capacity of 2500 cars yearly. The buildings will be finished in 60 days.

—

ST. JAMES, MO., April 30—The Universal Motor Truck and Traction Engine Co. will probably select a site in this city on which to build a $60,000 plant. The first truck model will be on exhibition by June 1. The factory will be completed by Jan. 1. The company was organized last November.

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FLINT, MICH., April 30—The Chevrolet Motor Co. has established a community eating house at its plant, where meals are furnished at cost to employees.

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OWOSSO, MICH., April 27—The Field Mfg. Co., which recently moved here from Ionia, will begin shipping truck bodies some time this week. The company manufactures a ½-ton truck body in the plant of Republic Motor Truck Co., Alma, Mich.

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MILWAUKEE, WIS., April 28 — The Davis Mfg. Co., a large manufacturer of gasoline engines for a variety of pur-

The 5 Per Cent Tax

Write your Washington congressman to-day protesting against the assessing of the 5 per cent war tax on automobiles at the source of manufacture. Do this on the ground that it is class legislation and if passed there is a probability it would be declared unconstitutional. Don't forget that the automobile industry stands ready and willing to carry its equitable share of the $2,000,000,000 war taxes that must be raised each year. The industry is, however, opposed to class legislation. It will pay its share in any increase in the excess profits taxed. It will pay its share in gasoline taxes, but opposes class taxation.

poses, is completing work on a machine-shop addition which will double its facilities, and on May 1 will break ground for a foundry addition, 100 by 300 ft., which will increase the casting capacity by 100 per cent.

—

TOLEDO, May 1—The Mather Spring Co. has granted its employees an eight-hour working day at ten-hour pay.

—

HARVEY, ILL., April 30—The Maxfer Truck and Tractor Co. has purchased a new plant here, one of the suburbs of Chicago, for the manufacture of its trucks. The new plant is ten times as large as the old plant, and production after the first of May will be 300 Maxfers per day.

DETROIT, April 30—The Packard Motor Car Co. has indefinitely postponed the building of its concert hall and service station, which, as reported in a recent issue of THE AUTOMOBILE, it planned to erect.

There is a possibility that the Packard company's resources may be commandeered in whole or in part and under the circumstances created by the war, the board of directors has considered it best to refrain from any outside enterprise at this time.

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CHICAGO, ILL., May 2—A strike of employees of the Stewart-Warner Speedometer Corp. over placing a woman in the position of a man who resigned has been settled. It lasted but a few days.

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Enger Plant Sale on May 24-25

CINCINNATI, May 2—The plant of the Enger Motor Car Co. will be sold at public auction May 24 and 25 by Winternitz & Co., Chicago, for the receiver, L. J. Dauner.

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Alter Factory For Sale

PLYMOUTH, MICH., April 30—The plant of the Alter Motor Car Co. is offered to the public for sale. It contains 22,000 ft. of floor space, and is equipped for the assembling of automobiles.

Production

CLEVELAND, April 26—The Chandler Motor Car Co. is shipping cars at the rate of over 28,000 cars a year. During the week of April 14 the company made a record shipment of 618 cars. In the first 2 weeks of April a total of 1173 cars were shipped, which indicates over 2400 for the month, 82 per cent ahead of a year ago. Last year total shipments were 13,073 cars. The shipments, by months, compare as follows:

	1917	1916
January	715	480
February	1348	926
March	2319	1008
April (2 weeks)	1173	667
Total	5555	3081

—

DETROIT, April 28—On Thursday, April 26, the Ford Motor Co. produced 3100 cars, the biggest day in its history. It is stated that April will be the biggest production month the company has experienced.

—

JACKSON, MICH., April 27—The Briscoe Motor Car Corp. is increasing its manufacturing schedule for the spring and summer by 5000 cars, and will also turn out 2000 Redden truck-makers monthly for the next 4 months. The Briscoe corporation has received telegram orders this past week for more than 5000 cars.

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CLEVELAND, April 27—On the first 1000 cars delivered by the Jordan Motor Car Co. the total replacements from the factory amounted to $387.50. This included no replacements of parts of minor equipment. The company has shipped to date $1,700,000 worth of cars, and the production for the coming year will be increased.

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ST. LOUIS, MO., April 27—The Maxwell Motor Car Co. assembling plant here is now turning out twelve complete Maxwells daily.

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DETROIT, May 2—The Harroun Motors Corp. has started production and is now building motors.

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CANTON, OHIO, April 27—The BeSaw Tire & Rubber Co. is planning an increase in its tire output from 150 to 500 tires a day. The capital is to be increased from $220,000 to $1,000,000. New buildings are being planned and work will be started on them in the near future. About 200 additional men will be needed in the plant.

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KENOSHA, WIS., April 27—The first trainload of trucks has left the Nash Motors Co. plant, comprising twelve Jeffery Quads and twenty-eight Jeffery All-Purpose trucks, to the H. Barcroft White Corp., Nash distributers in Syracuse, N. Y. This is a new record for individual shipments of Jeffery trucks.

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CLINTONVILLE, WIS., April 28—The Four Wheel Tractor Co., which as reported in earlier issues has been organized in Clintonville, to manufacture tractors and trucks in which power is applied to the four wheels, is beginning production, and expects to have twenty tractors out during May. The concern is capitalized with $125,000, and all the stock is taken up except $15,000 worth. The tractor is a light machine, designed to haul four plows.

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BAY CITY, MICH., April 27—The Tu-Ford Valve Tool Co. has commenced manufacturing its latest Tu-Ford valve tool for Fords. This raises the spring, and second, it automatically locks when the spring is raised, making it easy to remove the valve and still insure the tool holding the spring in raised position. The tool also holds the spring in place when removing the valve for grinding.

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MANSFIELD, OHIO, April 27—The Mansfield Tire & Rubber Co. has reached the mark set a week ago in making 1000 tires and 1000 inner tubes in 24 hrs.

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JACKSON, MICH., May 2—The Hayes Wheel Co., is enlarging its plant to increase its output to 18,000 hubs per day.

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PAINESVILLE, OHIO, May 2—The Collier Truck Co. has secured a $12,000,000 contract from a Cleveland corporation calling for the delivery of $2,000,000 worth of trucks this year. The company guarantees to deliver 500 trucks per month. New factories are to be erected and additional men employed. A Cleveland concern has furnished performance bonds to protect the Collier company.

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DETROIT, May 2—The Reo Motor Car Co. shipped a train load of fifty-one flat cars, each carrying three pleasure or truck vehicles, to Los Angeles dealer yesterday. The second shipment will be made in 4 weeks on the same set of flat cars. The Los Angeles dealer finds that train loads come through in 9 to 14 days, while less than train loads take 4 to 6 weeks. He unloads promptly, and has arranged with the railroads so that the train load of empty flat cars is immediately returned to the factory for another shipment.

Automobile Industry Taxed

The automobile industry stands willing to pay its just and equitable share of the $2,000,000,000 war tax which must be raised each year. The automobile manufacturers expect to pay a due proportion of this in the form of increased excess-profit taxes. They expect to pay in other ways, but are opposed to a 5 per cent tax on the selling price of all automobiles when sold from the factory to dealers and others. This is class legislation. As such it is unfair legislation. It should be opposed by every automobile manufacturer and every person connected with the industry. Do your part in opposition to this tax. Write your congressman at Washington protesting against it on the ground of its being class legislation. We are all willing to share our burden of war taxation, but we object to class taxation.

Personals

DETROIT, May 1—George W. Dunham, president of the Society of Automotive Engineers, has returned from Washington. Mr. Dunham is a member of the board for motorizing field artillery and he, in conjunction with the counselors of the Society of Automotive Engineers has established an office in Washington so that the society will be in close touch with the government.

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WASHINGTON, D. C., April 27—F. A. Seiberling, president of the Goodyear Tire & Rubber Co., and a director of the Chamber of Commerce of the United States, has been appointed chairman of a new wartime committee of the National Chamber. Mr. Seiberling's committee is expected to investigate and recommend a plan for taking care of the dependent families of soldiers engaged in the present war.

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DETROIT, April 30—Frank Briscoe, who recently resigned from the Briscoe Motor Corp., has offered his services to Washington through the Society of Automotive Engineers and has been called East for a conference.

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DETROIT, May 2—Frederick C. Blanchard has been elected vice-president in charge of manufacturing of the Detroit Lubricator Co. Mr. Blanchard was formerly works manager of the Ashcroft Mfg. Co.

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DETROIT, April 30—Hugh Chalmers, president of Chalmers Motor Co., will be one of the speakers at the convention of the Associated Advertising Clubs of the world, which meets in St. Louis, Mo., June 3 to 7.

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DETROIT, April 28—G. U. Radoye, whose resignation from the Hudson Motor Car Co. was recently announced in THE AUTOMOBILE, has been appointed assistant to Frank C. Kipp, manager of the carriage sales department of the Packard Motor Car Co.

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WINNIPEG, MAN., April 27—J. R. Archibald has been promoted to district sales manager of the Maxwell Motor Car Co. in Winnipeg and will be the manager of the Alberta and Saskatchewan districts.

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DETROIT, April 27—J. R. Collins has resigned from the Maxwell Motor Car Co. to become vice-president and treasurer of a large eastern concern. He was assistant general auditor.

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PITTSBURGH, April 28—H. R. Keeling will become advertising manager of the Haynes Automobile Co., Kokomo, May 7. He has been connected with the merchandising department of the Armstrong Cork Co., Pittsburgh. Prior to this connection, he was for 3 years a member of the staff of the Indianapolis *Star* and later was advertising manager of a large Indianapolis automobile distributing agency.

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DETROIT, April 30—Albert E. Schaefer, general manager of the Scripps-Booth Corp. was struck by an automobile truck last week and is suffering from a broken leg.

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DETROIT, April 30—James E. Morgan, secretary and treasurer of the Wallace C. Hood service bureau, has been assigned to the first division of the United States Navy, and is in service on the battleship Iowa. H. G. Moesta, special representative of the bureau, has been transferred for service on United States steamship Columbia, which entered active service April 21 as flagship for the Atlantic submarine flotilla. D. H. Geddis, sales manager of the Scripps-Booth Motor Car Corp. and Herbert J. Woodall, assistant branch manager of the Ford company of Chicago, are also on the Columbia.

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DETROIT, April 30—Eddie Pullen, the well-known racing driver, has been appointed technical expert of the Pacific Coast Chevrolet factory. He will travel the entire territory supplied by that plant and supervise the service of Chevrolet dealers.

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CLEVELAND, April 30—Herbert J. Douglas has joined the Standard Parts Co. and will have an important place in its accounting department. Mr. Douglas has been with the Sherwin-Williams Co. for 14 years, latterly as comptroller.

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BATTLE CREEK, April 30—A. H. Sollins, formerly with the Locomobile Co., is promoting an automobile factory here. A mass meeting was held recently and $26,850 of a necessary $50,000 was pledged.

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INDIANAPOLIS, April 30—Frederick S. Lawrie, has resigned as sales manager of the Spacke Machine & Tool Co., to give his attention to a selling agency which he is operating under his own name, with offices at 910 Merchants Bank Bldg. Mr. Lawrie represents a number of important concerns, including: Western Auto Machine Screw Co., Elyria, Ohio, standard and special screw machine products; Transue & Williams Steel Forging Co., Alliance, Ohio, heavy steel stampings; Metal Specialty Co., Cincinnati, light steel stampings; and Spacke Machine & Tool Co., special automobile machine parts.

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DETROIT, April 28—Ludwig Arnson and J. E. Simonds, have respectively been appointed in charge of offices established by the Duplex Engine Governor Co., in Detroit and Chicago. The Detroit office, just opened is at 901 Kresge Bldg., and the other at 2118 Mallers Bldg.

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DETROIT, April 30—Frank E. Sangbush has been appointed office sales manager of the Columbia Motors Co. Mr. Sangbush has been connected with the Abbott-Detroit Motor Car Co.

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DETROIT, April 27—Harry A. Fitzjohn has been appointed director of purchases for the Hayes-Ionia company of Grand Rapids. Mr. Fitzjohn was formerly purchasing agent for the Springfield Body Corp. and resigned to assume his new duties.

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FLINT, MICH., May 1—Victor Launeau has become chief automobile designing engineer of the Pan Motor Co., St. Cloud, Minn. The Pan Motor Co. is a new company organized under the laws of Delaware for $5,000,000 to manufacture automobiles, trucks and farm tractors. Mr. Launeau was formerly research engineer of the Buick Motor Co.

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TOLEDO, May 2—J. H. Hundt has become supervisor of sales of the Champion Spark Plug Co. He was formerly vice-president and sales manager of the Atlas Auto Supply Co., Chicago.

Chester Bevans, prominent in the Denver automobile trade, will cover Colorado, Utah, Wyoming and New Mexico for the Champion Spark Plug Co.

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ELECTIONS

BUFFALO, N. Y., April 27—The following officers were elected at the annual meeting of the board of directors of the Pierce-Arrow Motor Car Co.: President, Colonel Charles Clifton; vice-president, Henry May; second vice-president, W. J. Foss; secretary, L. H. Gardner, and treasurer, W. C. Wrye. This list of officials maintains the present personnel except for the election of W. J. Foss as second vice-president.

Mr. Foss was appointed commercial manager of the company in October, 1915. A few months later he was elected to the board of directors. He will continue to have full charge of all the company's selling activities.

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NEW YORK, April 30—E. S. Maddock has been elected first vice-president of the Guarantee Securities Corp., being advanced from the second vice-presidency. Paul Fitzpatrick has been made second vice-president, and J. Alexander, who has been secretary, has been elected treasurer and will serve in both offices. John B. Swinney has been added to the list of officers as assistant secretary. The company recently declared a dividend of 2 per cent.

Metal Prices Feature Market

Government Requirements Big —Wage Increases Cause Rise in Coal Field

NEW YORK, May 2—The exact effect of war on the metal markets not only of the United States but of the world is a little more definite than a week ago. Last week prominent men of the steel industry declared that government requirements will absorb between 2 per cent and 3 per cent of the mill capacity. This will amount to 900,000 to 1,300,000 tons. The steel men also agreed to appoint a committee for the purpose of distributing among steel manufacturers the various requirements of the government.

It is the general consensus of men in the steel industry that hoarding is still continuing by many manufacturers in varied lines of industries, notwithstanding assurances from metal experts that the steel demands of the U. S. Government and the Allies would not necessarily bring about a scarcity of steel. Further assurance is given that at the maximum the steel industry of this country is able to take care of all war demands without hardship to itself or to the consuming public. The question of supply is wholly aside from that of price. The cost of steel production is gradually increasing, an advance of from 10 to 15 per cent in wages having been started in many plants on May 1.

Pig Iron Advanced

Pig iron prices have advanced during the past week. Orders indicating various demands on the steel market are being recorded. France has been placing contracts for steel rails for 700 miles of tramways and trenches. Washington has contracted for 1000 tons of sheet to be used in the manufacture of camp equipage and powder tanks.

In the coal market the increase on May 1 of practically 20 per cent to anthracite workers may result in an increase in the price of coal ranging from 50 to 75 cents per ton. There is no shortage of coal at the mines but a very general shortage of surplus coal throughout the country due to lack of railroad shipping facilities. The consumption of anthracite coal is heavier because of the greater use of it by railroads. The late spring has increased the consumption.

Assurances that Argentina is not going to place an embargo on hides from that country is a welcome report. Our tanneries have been receiving great quantities of hides from that source and now that the supply from certain European countries has discontinued, it is correspondingly imperative to continue our supplies from other countries.

The recent orders from Washington directing the country's railroads to give coal and iron ore preference over all other traffic may relieve the present situation. This order will have a potent effect on shipments of other materials, etc., to the factories.

In lieu of arbitrary price fixing by the U. S. Government, it is expected that efforts will be made in the direction of a curtailment of steel consumption in fields not directly connected with the war. In this way supplies will be conserved and price reductions follow, as a matter of course. In the opinion of the steel trade, the prices are attributable to the buying of far in excess of needs. Consumers have rushed into the market in a panic in an effort to provide against future needs without regard to the effect of their action on prices. Experts state that Government demands will not bring about a scarcity of steel. At the maximum, the steel industry of this country is able to take care of all war demands without hardship to itself or to the consuming public.

The rise of $5 a ton on Bessemer and open-hearth steel featured the activities of the metals markets last week. Both are now quoting at $80, the highest in the history of the steel market.

Oils were higher, linseed quoting at $1.22 a gal., a 2 cent rise, and rapeseed oil at $1.35 a gal., a 5 cent rise. Kansas and Pennsylvania crude petroleum, however, remained unchanged. A rise in either of these two, it is stated, is bound to force up gasoline prices. Gasoline prices are gradually being readjusted throughout the country, rise having already taken place in St. Louis, Chicago and Minneapolis.

Gasoline Prices Higher

Apropos of the gasoline situation, prices are expected to rise considerably due to American and Mexican conditions. The American conditions have already been explained as due to the tremendous demand from the automobile market. Mexico, on the other hand, has recently decreed that a heavier export tax on oil and its derivatives be placed, thus hurting the heavy shipments of oil to Great Britain. As a result, it is expected that Great Britain will place much of its oil orders in the United States, thus further depleting our supply and forcing up prices on the derivatives. Mexico, however, is expected to increase its shipments this year, due to the launching of many additional oil carriers.

Cotton Acreage Decreased

According to estimates, the cotton acreage at the present time shows a decrease of 2.5 per cent as compared with a year ago. The propaganda for more grain and food crops is the chief cause. Makers of tire duck, etc., are expecting a large increase in prices. Tire prices as a consequence are slated for further increases. The cotton season is now 10 days late, the ground is poorly prepared in the eastern states, but unusually well in the West. Very little cotton is planted. As a result, there will be little demand for steel and other metals from this field.

Railroad managers are confronted with congestion on the Eastern lines, which results in a shortage of cars, although some improvement is being shown from week to week, and until the commerce commission has effected such legislation as to allow the roads to increase freight rates upon the basis in which petitions have been made, there is little probability of any buying of equipment being resorted to until some additional revenue is in sight.

It is stated that the Government in its next purchases of copper will pay substantially the market price, instead of demanding the recent low prices.

Rubber prices this week hinge on the war taxes. The cost of rubber manufacturing will be increased considerably if Congress adopts suggestions for imposing a tax on various crude materials now admitted free of import duty. A tax of 20 per cent has been suggested on crude rubber. This would jump the present price of approximately $1,500 a ton to $1,800. Another tax suggested provides for 2 cents a pound on unmanufactured cotton. At present the bulk of the long staple cotton used in tire manufacture is imported from Egypt.

Tire Prices Again Rise

Hardman and Delion Quotations Up 10 to 15%—Tubes Up 5%—Rubber Higher

NEW YORK, May 1—The Hardman Tire & Rubber Co. and the Delion Tire and Rubber Co. have taken the first step in the long expected tire-price increase. They have raised their prices from 10 to 15 per cent. Tubes are up about 5 per cent. It is expected that the other companies will follow suit because of the present conditions. Rubber and tire fabrics are advancing again. Yesterday the upward movement in plantation rubber which started late last week received fresh impetus on receipt of cables reporting a further advance of at least a ½ penny in the London market. Added to this is the threatened Government duty of 20 per cent on all rubber imports. The tire fabric mills are all sold up to the end of the year and some contracts with consumers cover part of next year's requirements. The scarcity of Sea Island and Egyptian staples has created an active demand for Peeler fabrics. Standard 17¼-ounce Sea Island and Egyptian fabrics are now about 5 cents a square yard higher.

The following prices will give a comparison of the old and new prices on Hardman and Delion tires:

Size	Old Price	New Price
Delion		
28 x 3, plain	$16.50	$18.50
34 x 4, plain	35.30	38.83
36 x 4, plain	37.30	41.03
Hardman		
30 x 3, plain	$15.00	$18.00
34 x 4, plain	31.90	37.00
36 x 4, plain	34.00	40.00

Low Spelter Prices Force Zinc Downward

JOPLIN, MO., April 27—Zinc ore dropped another $5 per ton this week making the top basis price for choice

(*Continued on page* 854)

ores in carload lots $75 per ton. The range was down to $65 which gives the average basis for the week $75 per ton. This drop in price brings the price of ore to a figure where numerous sheet-ground mines may be unable to continue operation. Many of the best producing properties can not produce concentrates below $70 with the present prices of supplies, powder and labor. Most supplies have increased in price during the past week.

The slump in prices has been brought about by the lower prices for spelter and evidence that the smelters themselves are making only a small margin of profit is shown by the fact that two large smelters of the American Lead, Zinc and Smelting Co. will close down in the near future, one at Deering and one at Neodesha for a total of more than 8000 retorts. A smelter at Sand Springs, Oklahoma with 8000 retorts is operating only a single block of about 600 retorts. Many other smelters are working far below capacity.

Lead ore remained firm all week with $110 paid for 80 per cent ores. Weather conditions have been excellent, heavy rains helping the dry mines more than they hurt the wet ones.

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GASOLINE PRICE INCREASES

MINNEAPOLIS, MINN., April 26—Gasoline prices here have been advanced 1 cent a gallon, making various grades 21 to 25 cents.

ST. LOUIS, MO., April 26—Gasoline has been advanced 1 cent a gallon to 19.4 cents. Naptha was also advanced 1 cent to 18.9 cents a gallon.

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25 Rainier Trucks for Government

NEW YORK, April 27—The Rainier Motor Corp. has sold a fleet of twenty-five trucks to the United States Government. These trucks are to be used by the Navy Department. All of the trucks are of the ½-ton capacity with express bodies.

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Federal Trucks for Red Cross

DETROIT, April 27—The Federal Motor Truck Co. has received orders for four 3½-ton trucks for the American Red Cross and four 3½-ton trucks for Red Cross service in Belgium.

Embargoes Cut Steel Output

Mills Choked with Finished Products Awaiting Distribution—Russian Contracts

DETROIT, April 30—Fresh railroad embargoes on freight shipments from Pittsburgh have choked the mills with finished products awaiting distribution, and it may become compulsory to cut down the output.

Concern Over Russian Contracts

The prospect of having to provide 500,000 tons of steel for construction of Russian cars and locomotives in this country in addition to meeting domestic and foreign contracts is causing concern in the steel trade. The government's present requirements which comprise 1,200,000 tons can be handled, according to the steel makers, but they state that the orders for Russia will overtax their resources.

Details apportioning the government's tonnage among the mills were arranged by a committee of steel companies last week. Probably more than 50 per cent of the steel needed will be provided by the United States Steel Corp. subsidiaries.

Orders for cars this month have been less than 6000, and orders for 60,000 tons of steel for car construction have been placed.

Locomotive builders have accepted contracts for 300 engines this month of which 170 are for foreign roads. About 50,000 tons of steel have been ordered with which to construct these engines.

Railroad buying of rails totaled 250,000 tons this week, all of which was under contract calling for delivery late in 1918 and early in 1919 so that no disturbance of present mill schedules will result.

Prices Generally Higher

There has been considerable activity in track supplies, which are now 20 per cent higher. Light rails are now $5 a ton higher. Other steel products are rising in price; bars are up $3; shapes $5 to $8, and plates $10 a ton on minimum quotation mill shipment and $5 to $10 a ton on warehouse shipment. New structural work is light. Great activity in the interior resulted in the sales of 130,000 tons of pig iron during the past week.

If increase in steel continues, all cars will be forced to increase prices at the rate of $90 per thousand by Sept. 1.

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Oldfield Motors To Build Aero Engines in Duluth

DULUTH, MINN., April 27—A new industry to manufacture aeroplane engines and employ 100 men in the outset will be established here and will be known as the Oldfield Motors Corp., and will also complete during this season a contract for 5000 6 hp. engines for gas tractors. The airplane engine which will be made by this company will be 125 hp. and will weigh 225 lb. It has met with the approval of the aviation section of the United States War Department, and it is expected that a large contract will be placed with the company by the Government. The company has taken over the old plant here, comprising several buildings, and the main building is 140 by 160 ft. The president of the company is Lee W. Oldfield, and associated with him are John B. Cooper, John P. Ernster, Harry M. Giles and Alfred Kreig.

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Ford Tractor for England

DETROIT, May 1—It is reported that Henry Ford was visiting Halifax, N. S., to which point he accompanied Charles E. Sorenson who has sailed for England with samples of the Ford tractor, tools, jigs, dies and all of the necessary plans to enable English makers to promptly start manufacture of the Ford tractor.

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290 Tractors in Washington

SPOKANE, WASH., April 30—There are 290 tractors in use in the State of Washington, out of the total of 34,371 in the United States, according to figures given out by the United States Dept. of Agriculture.

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220,000 Illinois Licenses to Date

CHICAGO, April 27—To date 220,000 automobile licenses have been issued in Illinois. The total number of licenses issued during 1916 was 248,429. Owing to the volume of work imposed on the department, drivers displaying 1916 licenses will not be molested until May 16, this being the final limit for displaying a 1917 plate.

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9378 Registrations in Maine

BANGOR, ME., April 28—Up to April 16, automobile and truck registrations in this State are far ahead of last year's record to that date. Automobile registrations total 9378 and trucks 1408, compared with 7487 and 860 last year up to that date. Dealers have been increased from 203 to 246.

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DETROIT, May 2—Clifford V. Herbert, who has been working at the De Palma Mfg. Co. perfecting his tractor, is shipping the machine to Suffern, N. Y., for demonstration before representatives of European countries.

Daily Market Reports for the Past Week

Material	Tues.	Wed.	Thurs.	Fri.	Sat.	Mon.	Week's Changes
Aluminum, lb.	.60	.60	.60	.60	.60	.59	— 0.1
Antimony, lb.	.34	.34	.34	.34	.34	.34	...
Bessemer Steel, ton	75.00	75.00	75.00	75.00	80.00	80.00	+5.00
Copper, Elec., lb.	.30	.30	.30	.30	.30	.30	...
Copper, Lake, lb.	.29	.29	.29	.29	.29	.30	+ .01
Cottonseed Oil, bbl.	15.35	15.50	15.70	15.85	16.00	16.03	+ .68
Fish Oil, Menhaden, Brown, gal.	.78	.78	.78	.78	.78	.80	+ .02
Gasoline, Auto, gal.	.24	.24	.24	.24	.24	.24	...
Lard Oil, prime, gal.	1.80	1.80	1.80	1.85	1.85	1.85	+ .05
Lead, 100 lb.	9.13	9.13	9.13	9.13	9.13	9.50	+ .37
Linseed Oil, gal.	1.20	1.20	1.20	1.20	1.22	1.22	+ .02
Open-Hearth Steel, ton	75.00	75.00	75.00	75.00	80.00	80.00	+5.00
Petroleum, bl., Kans., crude	1.70	1.70	1.70	1.70	1.70	1.70	...
Petroleum, bbl., Pa., crude	3.10	3.10	3.10	3.10	3.10	3.10	...
Rapeseed Oil, refined, gal.	1.30	1.30	1.30	1.30	1.30	1.35	+ .05
Rubber, Fine Up-River, Para, lb.	.75	.75	.75	.75	.75	.75½	+ .00½
Rubber, Ceylon, First Latex Crepe, lb.	.81	.81	.81	.81	.82½	.83	+ .02
Sulhpuric Acid, 60 Baume, gal.	1.50	1.50	1.50	1.50	1.50	1.50	...
Tin, 100 lb.	58.50	58.50	58.50	59.00	59.00	58.75	+ .25
Tire Scrap, lb.	.06½	.06½	.06½	.06¼	.06¼	.06½	...

Sleeve-Valve Engine Co. Formed

American Co. of Philadelphia Headed by Remington Arms Company Interests

PHILADELPHIA, May 1—The American Sleeve-Valve Motor Co., with executive offices in the Widener Bldg., has secured ownership of the patents covering a revolving sleeve as applied to internal combustion engines. The sleeve, which revolves between the cylinder wall and piston, is propelled by a large positive worm gear at the base of the cylinder. All moving parts, except the revolving sleeve, are of conventional type.

Manufacturing plans are now in progress and deliveries are expected to start by fall. The management includes men well known in the manufacturing field. E. Remington, of the arms and typewriter company bearing his name, is chairman of the board. P. E. Remington, of the same company, is president, and has dropped all other interests to prosecute the work of this company. Wilfrid Hartley, former treasurer and factory manager of the Remington Arms Co., is vice-president.

Among the other officers and directors are also a number of prominent men in the automobile field, including E. R. Hollander, former president of the American Fiat Sales Co.; T. M. Fenner, of the Wisconsin Motor Mfg. Co.; C. P. Hollister, chief engineer, formerly with the Stanley Electric Co.; H. S. Evans, vice-president, sales manager of the International Time Recording Co.; LeRoy Ferry, of Ferry & Giol, export merchants, of Barcelona, Milan, Paris and Philadelphia; H. R. Davis, president of the First National Bank of Freeport, L. I., N. Y., and J. E. Fite and Alexander Lawrence, Jr., manufacturers in this city.

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NEW COMPANIES

CLEVELAND, May 2—The Supreme Motors Corp. has incorporated for $1,000,000, half preferred and half common. C. F. Jamison, president, was formerly sales manager of the Saxon Motor Car Co.; B. S. Cline, vice-president; Chas. F. Davies, secretary; A. Lavery, treasurer; Courtney Mitchell, chief engineer; C. F. Manning, formerly experimental engineer of the Continental Motors Co., experimental engineer.

The company will make three styles of aeroplane motors with L-head and aluminum pistons, four-cycle and six-cycle types, each 3¼ by 5. The twelve-cycle type will be 2⅜ by 5. Production will be started October 1, when 7500 motors will be manufactured during the first year and 20,000 the second year.

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DETROIT, April 30—The Consolidated Truck & Tractor Co. has been incorporated in Michigan by Z. C. Barber and Forest M. Keeton to manufacture and sell a truck attachment designed by Mr. Keeton. Mr. Keeton was formerly a member of the Keeton Motor Car Co. It is stated that manufacturing arrangements have been completed with a large plant in this State for producing these truck units and that many contracts have already been placed. The capital is $1,500,000, divided into $500,000 preferred and $1,000,000 common.

—

ADRIAN, MICH., April 30—The F. D. Truck and Auto Co. has been formed as a successor of the Forduplex Co. It is said the Duplex Motor Co., Lansing, objected to the use of the latter name, although the Ford Motor Co. gave its consent.

—

CHICAGO, April 27—The Oak Mfg. Co., has been organized in Chicago to manufacture a six-cylinder passenger car, with a hydraulic transmission, and a rotary-sleeve engine of the Argyll type. The offices are located at present at 108 South La Salle Street. According to S. O. D'Orlow, designer, the new car will sell at about $1,560.

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WORCESTER, MASS., April 27—The Thibert Mfg. Co. has been incorporated with a capital of $50,000 to manufacture automobiles. N. R. Thibert is president and treasurer.

—

FOSTORIA, OHIO, April 27—The Fostoria Pressed Steel Co. has been incorporated for $100,000 by W. C. Allen, C. D. Pifer and Henry Rothcock. The company will supply all steel work for Allen cars and for steel needed in the Dale Body Co., which manufactures bodies for the Allen.

—

SAN FRANCISCO, CAL., April 27—The Bulls Eye Tread Tire Co. is to reorganize with a capital of $3,000,000 and become a subsidiary of the Pacific States Tire & Rubber Co. A factory for making a new patented tire will be built and equipped at Sunnyvale.

—

SAGINAW, April 30—The Saginaw Auto Body has been incorporated with a capital of $100,000 to manufacture automobile bodies. The company has purchased a plant in this city and will start production in the near future.

—

LOS ANGELES, CAL., April 27—The Peerless Wheel Co. has been incorporated to manufacture automobile wheels. The capital is $15,000. The incorporators are: F. E. Powers, G. E. Somarindyk and R. A. Armstrong, all of this city.

—

OWENSBORO, KY., April 26—The Franks Tractor-Cultivator Co. is being organized by W. L. Franks, who will be president and general manager, W. O. Hoskins, W. L. Morton, James Jones and others, and will be capitalized at $50,000 to manufacture a tractor-cultivator.

—

LYNCHBURG, VA., April 26—The Double Action Tire Pump Co. has been formed with a capital of $50,000. A. T. Henderson is secretary.

$18,750,000 Net for G. M.

Sales Total $120,250,000 for 112,178 Cars and Trucks for 8 Months

NEW YORK, May 2—Net profits of $18,750,000 are reported by the General Motors Corp. for the 8 months' period ending March. Gross sales totaled $120,250,000. Compared with the same period a year ago profits increased 7 per cent and sales 17 per cent.

Car and truck sales during this 8 months' period totaled 112,178, against 86,558 in the same period of the 1915-16 year. This is an increase of 25,620 vehicles, or a gain of 29.6 per cent.

March net profits totaled $2,750,000 against $1,633,000 in March a year ago. This is one of the largest comparative gains in any month of this fiscal year.

General Motors, despite high cost of raw materials and the general advance in cost of operation, continues to run strong in cash. As of April 25 the company had in the banks a total of $23,475,000 against $22,576,575 on July 31 last. In other words, the cash alone is $3,475,000 larger than the par of the $20,000,000 preferred of the new corporation.

CLINTONVILLE, WIS., April 28—Another four-wheel drive truck company is being formed in Clintonville. This is to be known as the Clintonville Duplex Truck Co. This is not the same concern as the Duplex company of Lansing, Mich.

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MIDDLEFIELD, OHIO, April 26—The Charles Valve Remover Co. has been formed with a $10,000 capital by Charles Wilkerson, E. H. Brigden and others to manufacture an automobile repair tool.

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DOVER, DEL., April 26—The First National Finance Corp. has been formed to deal in automobiles, loan money upon security, etc. The capital is $3,000,000. The incorporators are F. R. Hansell, G. H. B. Martin, S. C. Seymour, all of Philadelphia.

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CLEVELAND, April 27—The Argue Lamp & Appliance Co. has been incorporated with a capital of $100,000 to manufacture automobile lamps and other accessories. The incorporators are: Oscar M. Sheck, F. L. Norman, C. R. Welch, Robert McLaughlin and E. P. Strong.

—

ROCHESTER, N. Y., April 26—The Giant Tire & Sales Co. has been chartered to manufacture tires. The company is capitalized at $10,000. The directors are: J. M. Johnson, L. Z. Johnson, A. L. Dutton, E. F. Gamrod and J. A. Huber. Offices are in the Carter Building.

Standard Parts Earns 25%

Company Closes Contracts for 150,000 Sets of Springs for One Car Builder

CLEVELAND, April 27—Earnings of the Standard Parts Co. during March were at an annual rate of more than 25 per cent on the common stock, which is larger than the rate in any of 3 preceding months. The company yesterday closed a contract to furnish a leading automobile maker with 150,000 sets of springs. While word comes from the automobile and allied industries that some of the companies are feeling the effects of the economy campaign, President Christian Girl says that his company has not experienced such effects, and adds that a certain automobile maker which recently had cancellations due to the economy movement has within the same period of time had new orders which doubled the number of cancellations.

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Wilson Body Secures $1,000,000

BAY CITY, MICH., April 30—The C. R. Wilson Body Co. has secured $1,000,000 in 3 and 5-year 6 per cent bonds for its plant in this city. The Wilson company uses the plant here for wood-working.

This company is negotiating with one automobile manufacturer for a contract for 30,000 automobile bodies. When this contract is closed the company will probably greatly increase its building and machinery capacity.

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United Motors Co. to Make Trailers and Tractors

GRAND RAPIDS, MICH., May 1—The United Motors Co. of this city will make trailers and tractors in addition to its present large motor truck line.

The company is erecting a number of buildings for this purpose including a woodworking building where the trailers will be manufactured. At present the trailers are being manufactured by outside concerns.

The tractor rights were acquired from the owner and a number of the machines have already been made and operated secretly, and found successful.

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New St. Paul Interests in Regal Motor Car Co.

DETROIT, April 30—The Lambert interests in the Regal Motor Car Co. have, in great part, changed hands. John Lambert and Charles Lambert have sold their interests in the company, though Bert Lambert retains an interest and will remain as a director of the company. The Lambert interest has been purchased by St. Paul, Minn., capitalists who are represented by Frank H. Shaw, now treasurer of the Regal company. Mr. Shaw was formerly in the banking business in St. Paul.

F. W. Haines remains as president of the company. H. H. Emmons has resigned as secretary and joined the United States Navy. He is succeeded by M. T. Boden who was formerly the treasurer of the company. Other officials remain as heretofore.

The Regal company is now producing ten to twelve cars daily and with the new working capital, expects to attain a capacity of twenty cars per day in the near future.

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Price Changes

Overland Big 4, 3-Pas. Roadster.	$835	$880
Overland Big 4, 5-Pas. Touring.	850	895
Overland Light 6, 3-Pas. Rdster..	970	1,010
Overland Light 6, 5-Pas. Touring.	985	1,025
Baker R & L, Bx7, 4-Pas. Coupe.	2,800	3,000
Baker R & L, Jx7, 5-Pas. Brohm.	3,000	3,200
Premier, 7-Pas. Tourer.....	1,895	1,985
Premier, 4-Pas. Rdster.....	1,895	1,985
American Six, 5-Pas. Touring...	1,285	1,375
Empire 6, 5-Pas. Touring.....	1,235	1,285
Empire 6, 7-Pas. Touring.....	1,265	1,315
Empire 4, 5-Pas. Touring.....	960	1,125
Kent, 4-Pas. Roadster.....	985	1,085
Kent, 5-Pas. Touring.....	985	1,085

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NEW YORK, April 27—The Baker R. & L. Co. will raise its prices May 1 $200 on both of its models. On that date the model BX7 four-passenger coupe will sell for $3,000. The JX7 dual drive brougham five-passenger model will sell for $3,200.

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NEW YORK, April 27—The Premier Motor Corp., Indianapolis, will raise its prices May 1 on both its models. On that date both the seven-passenger touring car and the four-passenger roadster will be raised in price from $1,895 to $1,985.

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200 Per Cent Earnings for Michigan Copper

DETROIT, May 3—The Michigan Copper and Brass Co. is rumored at earning 200 per cent, or between $400,000 and $500,000, this year.

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Prescott Rings Bear Maker's Name

WEBSTER, MASS., April 28—The Prescott Auto Parts Co. has established a branch in Chicago at 910 South Michigan Avenue. Prescott rings hereafter will be stamped with the name of the manufacturer.

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Military Axle Types

In its preliminary report of the specifications of military trucks drafted by the War Department in co-operation with the Society of Automotive Engineers, THE AUTOMOBILE stated that preference would be given to final worm drive, which information came from authoritative sources. When the complete draft of specifications for 1½ and 3-ton trucks was issued it was discovered that all types of axles were included. The specifications with regard to type of drive are:

Type of Drive: The trucks may be provided with any suitable standard type of drive such as internal gear, bevel gear, worm gear or chain drive. Preference will be given to that type of final drive which provides the greatest amount of ground clearance in conjunction with provision for retaining grease or oil and excluding dirt.

Fisher Body Earns $5.56 a Share

6 Months' Service Is $1,288,836—Net Income $1,463,836—Assets $11,381,788

NEW YORK, April 26—The Fisher Body Corp. has filed with the New York Stock Exchange the following consolidated statement of income of the parent company and subsidiaries for the period Aug. 21, 1916, to Feb. 28, 1917:

Profits from operations.....	$1,369,730
Other income—interest, rentals, etc.	94,106
Total net income.....	*$1,463,836
Dividends paid on preferred stock.	175,000
Surplus	$1,288,836

*After allowing for full dividend requirements of 7 per cent on 50,000 shares of preferred stock, the balance applicable to the common stock is equivalent to $5.56 a share earned during the above period on 200,000 shares of common stock.

The consolidated balance sheet as of Feb. 28 shows:

Assets.

Land and buildings.....	$2,735,591
Machinery and equipment.....	1,764,186
Patents	250,020
Cash on hand and in banks.....	642,843
Accounts receivable	2,282,812
Raw materials (at cost).....	1,939,302
Work in process (at cost).....	1,719,998
Deferred charges to future operations	47,033
Total	$11,381,788

Liabilities.

7 per cent cumulative preferred, 50,000 shares of $100 each.....	$5,000,000
Balance, as of date of organization, represented by 200,000 shares of common of no par value.....	2,111,324
Notes payable—bank.....	1,480,000
Building loans—bank.....	300,000
Accounts payable	773,456
Accruals	200,127
Reserves—Depreciation, war tax, etc.	228,042
Surplus	1,288,836
Total	$11,381,788

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$417,140 Earned by Paige in Quarter

PHILADELPHIA, April 30—The net earnings of the Paige-Detroit Motor Car Co. for the quarter ending March 31 were $417,140 which is 23.83 times the preferred dividend requirements for the quarter. After deducting the quarterly preferred dividend requirements of $17,500 there remains an amount applicable to the common stock of 26.6 per cent or on the basis of 106 per cent per annum.

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Gray & Davis Average $100,000 Monthly

BOSTON, MASS., May 1—Gray & Davis averaged $100,000 per month during the March quarter. These earnings are only in part from war work. The floating debt situation is showing steady improvement. In the last few months there has been a sharp cutting down in the amount of outstanding notes.

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Locomobile Assets $15,218,431

BOSTON, April 26—The Locomobile Co. of America, Bridgeport, Conn., has filed an abstract of certificate of condition

under the business corporation law of Massachusetts showing total assets and liabilities of $15,218,431.50. Real estate is valued at $186,500, and its machinery at $2,793,578.34. Merchandise, including manufactures, material, and stock in process, is valued at $5,395,668.99. Patent rights, trade marks, good will, are given at $5,494,579.78. The capital stock is $6,250,800, paid in, the authorized capital stock being $6,500,000. Accounts payable total $336,370.23. The funded indebtedness amounts to $1,863,500, the floating indebtedness to $4,293,457.45, and the surplus to $1,585,903.96. Profit and loss reserves total $888,399.85.

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$542,000 Profits for Stewart-Warner

CHICAGO, April 30 — The Stewart-Warner Speedometer Corp. reports profits for the first quarter of $542,000 as against $571,000 for 1916. This year it has been necessary to get up a heavy reserve to cover the increase in the Federal Income Tax, and in general. The business was excellent for March, having been the largest month in the history of the corporation.

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DIVIDENDS DECLARED

Mitchell Motors Co., quarterly of 1½ per cent, payable May 24 to stock of record May 10.

Yale & Towne Mfg. Co., extra of 5 per cent, payable May 21 to stock of record May 14.

Republic Rubber Co., quarterly of 2 per cent on common and 1¾ per cent on preferred.

Studebaker Corp., quarterly of 1¾ per cent on preferred and 2½ per cent on common, payable June 1 to stock of record May 19.

Automobile Issues Stronger

General Motors, Chevrolet, United Motors and Stewart-Warner Show Gain

NEW YORK, May 2—Automobile issues were a little stronger last week, occupying a prominent position in the activities of the securities market. General Motors, Chevrolet, United Motors and Stewart-Warner were especially active. The unusual activity in General Motors preferred revived discussion of the possibilities of a plan for retiring the preferred stock and clearing the way for the common. Chevrolet sold up to 102 and United Motors, the most heavily traded in of all the Curb industrials, swung up from a low of 29¾ to a high price of 33½.

United Motors' rise was made easy by the fact that heavy selling has been going on for a long time, and the stock is now technically in fine condition for a rise. Stewart-Warner was strong on report of a record business in March. The company is operating to full capacity and is booked to the limit for most of this year.

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Field Motor Sells Stock

GRAND RAPIDS, MICH., April 28—The Field Motor Co. is increasing its working capital by an issue of $200,000 common and non-assessable stock. This is a portion of the $300,000 issue available for public purchase.

The Field company manufactures a four-cylinder, double-opposed engine, using low-grade oils and fuel. It operates with a standard carbureter, requiring no readjustment. One prominent tractor manufacturer has a standing order for 5000 engines annually, and other tractor manufacturers are interested.

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Offers Tractor Stock to Public

ANN ARBOR, MICH., April 27—R. T. Dobson, of this city, is offering the stock of the One-Man Underslung tractor plow and tractor to the public at $10 per share.

Mr. Dobson has purchased the entire company and will incorporate it for $500,000, of which stock to the amount of $250,000 or $300,000 is being offered at this time. Instead of selling stock now Mr. Dobson is accepting reservations. The One-Man tractor is now working daily on several farms near Ann Arbor.

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Dayton Rubber $400,000 Stock Issue

CINCINNATI, April 30—The Dayton Rubber Mfg. Co., Dayton, will issue $400,000 of its preferred stock through Chatfield & Co., investment broker. The proceeds of the stock issues are to be used to finance the construction of a new factory in West Dayton. The preferred stock will be 7 per cent. The issue is callable at 115 and accrued dividends. Application to list on the Cincinnati Stock Exchange will be made.

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Capital Change

ALBANY, N. Y., April 26—The Bijur Motor Lighting Co. has increased its capital from $650,000 to $2,000,000.

Automobile Securities Quotations on the New York and Detroit Exchanges

	Bid	Asked	Net Ch'ge
*Ajax Rubber Co.	67¼	70	+ ¼
*J. I. Case T. M. Co. pfd.	83	86	..
Chalmers Motor Co. com.	..	22	..
Chalmers Motor Co. pfd.	..	..	..
*Chandler Motor Car Co.	95	100	+2
Chevrolet Motor Co.	102	105	+4
Fisher Body Corp. com.	..	38	..
Fisher Body Corp. pfd.	90	93	—4
Fisk Rubber Co. com.	70	75	..
Fisk Rubber Co. 1st pfd.	103	106	..
Fisk Rubber Co. 2d pfd.	..	..	..
Firestone Tire & Rubber Co. com.	127	131	—5
Firestone Tire & Rubber Co. pfd.	106½	108	+ ½
*General Motors Co. com.	108½	109	+6¼
*General Motors Co. pfd.	91	91¾	+4¾
*B. F. Goodrich Co. com.	51⅛	51½	+3⅜
*B. F. Goodrich Co. pfd.	107	108	..
Goodyear Tire & Rubber Co. com.	210	215	—5
Goodyear Tire & Rubber Co. pfd.	106½	108	+ ½
Grant Motor Car Corp.	5	8	..
Hupp Motor Car Corp. com.	3½	4½	..
Hupp Motor Car Corp. pfd.	74	80	—1
International Motor Co. com.	..	16	..
International Motor Co. 1st pfd.	..	70	..
International Motor Co. 2d pfd.	..	30	..
*Kelly-Springfield Tire Co. com.	52	55	+2
*Kelly-Springfield Tire Co. 1st pfd.	88	94	+1
*Lee Rubber & Tire Corp.	19¾	20½	— ¼
*Maxwell Motor Co., Inc., com.	49¼	50¼	+1
*Maxwell Motor Co., Inc., 1st pfd.	64	67	—2
*Maxwell Motor Co., Inc., 2d pfd.	31	31¼	+1¼
Miller Rubber Co. com.	205	215	—10
Miller Rubber Co. pfd.	104½	105¾	..
Packard Motor Car Co. com.	..	160	..
Packard Motor Car Co. pfd.	..	101	..
Paige-Detroit Motor Car Co.	33½	35	+4½
Peerless Truck & Motor Corp.	12	15	..
Portage Rubber Co. com.	143	149	—2
Portage Rubber Co. pfd.	..	..	..
Regal Motor Car Co. pfd.	..	24	..
Reo Motor Car Co.	31¼	32	+3¼
*Saxon Motor Car Corp.	47½	50	—2⅜
Springfield Body Corp. com.	60	70	—2
Springfield Body Corp. pfd.	100	120	—2
Standard Motor Construction Co.	13	13½	..
*Stewart-Warner Speed. Corp.	80½	81½	+7
*Studebaker Corp. com.	87½	88	+2½
*Studebaker Corp. pfd.	104½	106	+ ½
Swinehart Tire & Rubber Co.	65	75	—5
United Motors Corp.	33½	33⅝	+3½
*U. S. Rubber Co. com.	57½	58¼	— ¼
*U. S. Rubber Co. pfd.	106¼	108	+ ¼
*White Motor Co.	45¾	47	+ ¾
*Willys-Overland Co. com.	30	30¾	+ ⅛
*Willys-Overland Co. pfd.	95½	96	..

*At close April 30, 1917. Listed New York Stock Exchange.

OFFICIAL QUOTATIONS OF THE DETROIT STOCK EXCHANGE

ACTIVE STOCKS

	Bid	Asked	Net Ch'ge
Auto Body Co.	..	31	..
Chalmers Motor Co. com.	..	..	..
Chalmers Motor Co. pfd.	..	..	..
Continental Motor Corp. com.	7	7½	..
Continental Motor Corp. pfd.	97	99	+ ¼
Ford Motor Co. of Canada	..	280	..
General Motors Co. com.	..	..	..
General Motors Co. pfd.	..	..	..
Maxwell Motor Co. com.	..	..	..
Maxwell Motor Co. 1st pfd.	..	..	..
Maxwell Motor Co. 2d pfd.	..	..	..
Packard Motor Car Co. com.	145	151	..
Packard Motor Car Co. pfd.	..	100½	..
Paige-Detroit Motor Car Co.	34¾	35	+4½
Prudden Wheel Co.	27½	..	..
Reo Motor Car Co.	32	32⅜	+3½
Studebaker Corp. com.	..	..	..
Studebaker Corp. pfd.	..	..	..
C. M. Hall Lamp Co.	23	25½	..

INACTIVE STOCKS

Atlas Drop Forge Co.	..	..	..
Kelsey Wheel Co.	..	..	..
Regal Motor Car Co.	..	26½	..

Tractor To Solve Food Problem

More Needed to Increase Crop —Horning Talks on Ultimate Tractor Engine

MINNEAPOLIS, April 30—The importance of this city, and this section of the country, in the solution of the problem of the world's future food supply was emphasized by H. L. Horning, addressing seventy-five members of the Minneapolis Section of the Society of Automotive Engineers, because here is concentrated the center of the food supply of the United States and tractor industry. He said:

"The tractor is the solution of the food problem. The difficulty now is to get material and labor for the industry. To increase the supply of tractors is the call of to-day."

As chairman of the S. A. E. committees on tractors and fuel, Mr. Horning reported a conference with the National Council of Defense and its agreement of the importance of the tractor in the food problem as being capable of greatly increasing the crop. He reported progress in standardizing fuels and probable low cost as the result of new processes of cracking. The gist of his morning paper was that the four-cycle, four-stroke vertical type, with the early application of kerosene, is the ultimate type of tractor engine.

This should be capable of delivering 16 to 40 hp. continuously without distress at full load, or over, at from 750 to 1230 rev.

Questions by members brought out the importance of understanding the combustion chamber in developing the engine and determining correct compression, that the lightest compatible lubricating oil should be used and that constant level splash is the best lubricating system, though force feed also has possibilities.

—

Technical Board Formed by Packard

DETROIT, April 30—Because of the increasing importance of standardized service the Packard Motor Car Co. has formed a technical service board composed of experts from the eight largest points in the Packard organization. The board will convene monthly at the factory under the chairmanship of C. R. Lester, who is the technical service manager. It is the intention of the organization to consider in detail general conditions of service.

—

New Tractor Uses Oscillating Driving Drums

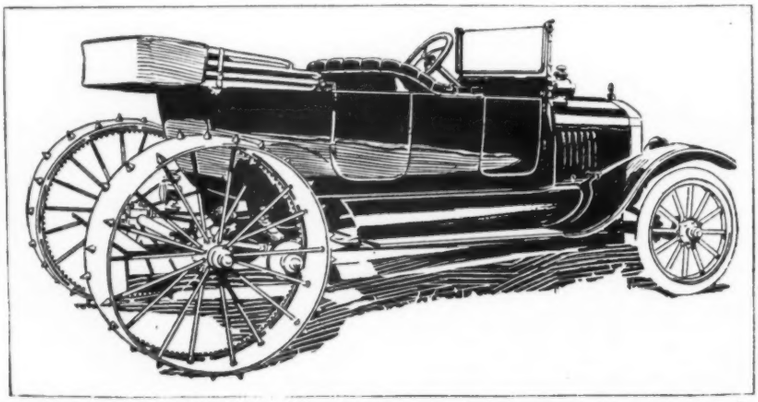
DETROIT, April 30—William Turner, a ranch owner of Washington, has invented a tractor and successfully demonstrated it on his western farms. The tractor weight is evenly distributed on two large driving drums which oscillate, and enable the tractor to cover any uneven surfaces of ground. It is constructed with a low center of gravity to allow it to be driven on side hills without turning over, is driven by a gasoline engine and has a large platform for carrying heavy loads of farm products. It will turn in its own area.

—

Smith Attachment Converts Fords into Farm Tractors

CHICAGO, April 30—The Smith Form-A-Tractor Co. has recently organized in Chicago by practically the interests now controlling the Smith Motor Truck Corp. and will place on the market an attachment for converting the standard Ford touring car into a farm tractor. The attachment will sell for $255 and it is stated that any Ford can be made a tractor in 15 minutes without the necessity for any machine work.

The attachment consists of a channel section frame which attaches to the Ford front axle, extends under the Ford chassis beyond the rear axle and is connected with a dead tractor axle made of 2-in. cold rolled steel which is designed to receive two tractor wheels. The work of transformation is completed by removing the Ford rear wheels and replacing them with driving pinions designed with a keyway, to fit into the key of the Ford axle, the driving pinions fitting over the brake drums and brake bands and retaining all the braking features of the Ford car.



Smith Form-a-Tractor, which converts a Ford into a tractor in 15 min. without machine work

Urges Standard Ignition Parts

H. E. Rice Emphasizes Heavy Expense Entailed by Great Number of Special Parts

PHILADELPHIA, April 26—The necessity of standardizing certain parts in connection with battery ignition systems was emphasized at the monthly meeting of the Philadelphia Section, Society of Automotive Engineers, held in this city tonight. The speaker, H. E. Rice, sales manager of the Atwater Kent Mfg. Co., was emphatic with regard to the needs of standardization. The large number of small fittings needed because of special installations gave rise to the suggestion and Mr. Rice believes that one or two standard ignition mountings could satisfactorily take the place of the large variety now used. Mr. Rice further suggested that ignition makers as well as manufacturers of motors and complete cars would welcome such activity in standardization work.

Here is how Mr. Rice expressed himself on this:

"The general details of ignition installation are in great need of standardization, and it is a relief to realize that the standards committee have this general subject under consideration. At present the vast number of special fittings and special installations required is an enormous manufacturing burden and an important cost factor. Any standardization which will make it possible for one or two standard ignition mountings to take the place of the large variety now used should be welcomed.

"It should be possible to standardize the socket or mounting which holds the ignition distributer so as to make all of them interchangeable. I will submit photographs showing six different distributer shanks which the concern with which I am connected now furnishes to various car manufacturers, and even with six shanks from which to choose, we are still frequently asked to manufacture special shanks.

"The ignition drive shaft and connection is another detail worthy of comparison. We now must make up a wide variety of shafts as well as shanks, and the shaft situation is even more serious because we must be able to supply them for four, six and eight cylinder motors, multiplying the necessary varieties by three.

"Ignition equipment installation can be standardized as readily as any other electrical or mechanical equipment, and it is doubtless only a matter of time when it will be done. I believe, however, that the mechanical details of installation which are now suggested for standardization are capable of further refinement, reductions in some dimensions can be made with resultant economies, and it is possible that the standards now established may have to be supplemented at some later time."

Mr. Rice stated that out of 108 auto-

mobile makers eighty-six are to-day fitting battery ignition systems as compared with twenty-two using magneto systems. Of the latter many are using dual magneto systems which he described as being virtually battery systems.

In reviewing the development of ignition apparatus, he pointed out that ignition equipment represents only about 1 per cent of the total cost of the complete car, but is 100 per cent important to the operation of the car.

"Battery ignition," he said, "may be divided into two general types and classified as open circuit and closed circuit systems. In each system the elements are almost identical, consisting of a combination, low-tension circuit breaking and timing device, a transformer coil with primary and secondary windings, and a distributing device for connecting each spark plug in its proper order to the high tension winding of the coil.

Little Energy Consumed

"The open circuit contact maker is so designed as to close the circuit of the transformer coil momentarily for each spark, the time interval being uniform at all motor speeds. The time during which the primary current flows through the coil is approximately 0.033 sec. for each spark. The current flow for this brief instant is about 4½ amp. but the time is so short that the energy consumed is almost negligible; a six-cylinder system requires less than 0.6 amp. at highest motor speed and dry cells are economically used for current.

"In the closed circuit system the same elements are used except that the contact maker is operated by direct cam action and the electrical windings are proportioned differently. The form of the contact maker has been evolved from the magneto and consists of a simple arm carrying a contact point and controlled by a spring to bring the contact together. The contacts are separated by the action of the cam on the timer shaft.

"By reason of this simple cam action, the circuit is closed for a longer time interval than with the open circuit system and the contact varies with the speed —a long contact at low speed becoming shorter as the speed increases.

"This is a much simpler type of contact maker than required by the open circuit system, but it takes more current, and should the circuit be left open with the motor closed, the battery will be discharged at a rate limited only by the resistance of the primary circuit.

"The current characteristics of the closed circuit system are the reverse of the open circuit system. The former takes a maximum current when the motor is not running, falling as the motor starts and reducing with speed. In the open circuit system, current consumption is zero at zero speed and increases in direct proportion to the speed. While the open-circuit system is widely and successfully used, the closed-circuit system undoubtedly is simpler in construction and its manufacturing cost is considerably lower. It is therefore in wider use than any other type."

Bad Truck Bills in New York

One Requires Tires Double Present Width—Other Limits Gross Weight

ALBANY, N. Y., April 30—Commercial vehicles in this State will be hard hit if drastic bills are passed requiring all trucks mounted on solid tires to be provided with tires double the width of those now used. The allowable maximum wheel loads would be from 25 to 50 per cent less than those recommended by all solid tire manufacturers. The Motor Truck Club has been fighting this bill and has succeeded in having it held off until the next meeting of the Legislature.

Besides the tire load capacities proposed, the bills, introduced by Assemblyman Kasson and Senator Robinson, also seek to limit the gross weight of all vehicles to 28,000 lb., except by special permit; the gross weight on any axle to be 20,000 lb.; total weight signs or plates attached to each vehicle; limit the length to 28 ft. and width to 8 ft.; and regulate the speed according to the tire width. The last named is unsatisfactory for those trucks which use singles in the front and duals in the rear. This would restrict them to two different speeds.

—

N. Y. Traffic Bill Passed

ALBANY, N. Y., May 2—The Welsh bill for uniform traffic regulations throughout the state was passed by the Assembly and sent to the Senate last night. The bill has been amended so that it does not apply to the city of New York. It provides a system of signals for movements of all vehicles and makes the speed limit driving that does not endanger other users of the highways.

—

Crowther Sale Ordered Discontinued

BUFFALO, N. Y., April 27—Sale of the property of the Crowther Motors Co. was ordered discontinued yesterday in the United States district court. The Crowther company recently filed a bankruptcy petition. Helen E. Martens, who holds a mortgage valued at $25,000 against the company, recently started an action in the Supreme Court of Monroe County to recover on the mortgage which she could not proceed after the bankruptcy petition was filed. On order by the United States district court she can continue her action.

—

Status of Foreign Patents in United States Unchanged

WASHINGTON, D. C., April 27—The status of patents held in this country by residents of foreign countries now at war with the United States will remain unchanged for the present, according to Thomas Ewing, Commissioner of Patents.

The laws of the United States provide that in emergency the Government can take over and make use of any patents. If the output of any manufactured article controlled by a patent is inadequate, the Government can authorize the manufacture by another concern, the amount of damages to be adjusted later in the courts.

All of the warring powers except Russia and Germany have agreed to keep in force patents already granted to enemies.

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Discontinue Time Payments on Trucks

NEW YORK, April 26—The National Bond & Investment Co. and the Empire Securities Co., both of Chicago, have discontinued for the time being the handling of time-payment paper for truck dealers. The Bankers Commercial Corp., this city, will not accept any further paper on passenger cars, but has not withdrawn so far as trucks are concerned. The other concerns are continuing in the work without serious modification due to war finances.

—

No Receiver for Gibney Tire

PHILADELPHIA, April 28—Stockholders of the Gibney Tire & Rubber Co., Conshohocken, successfully opposed an effort by council to have the Federal Court appoint a receiver for the company yesterday. At this hearing before Judge Thompson it was alleged that the resolution of the Board of Directors admitting insolvency was illegally procured. Creditors claim that the company's liabilities are about $800,000, which they allege is in excess of its assets.

—

Double Tax for N. Y. Automobiles

ALBANY, N. Y., April 30—Passenger car owners in this State are to be taxed doubly as a war measure, according to Senate Bill No. 2047, introduced by the Committee on Taxation and Retrenchment. It is expected that if this measure should pass it would bring into the treasury of the State about $2,000,000 in addition to the taxes already placed on passenger cars. The measure would become effective immediately, and on all cars purchased on and after Aug. 1, 1917, and up to and including July 31, 1918, the purchasers would be compelled to pay twice as much for license plates as they must pay at present.

Automobilists have been promised that the bill will be amended so that any tax paid by them to the Federal Government shall be deducted from the increase they must pay to the State if the bill becomes a law.

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Auto-Kamp Co. Enlarging Plant

SAGINAW, April 30—The Saginaw Auto-Kamp Co., which makes trailers, is enlarging its plant and will increase its production to twenty-five trailers a day.

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Wisconsin May Raise Automobile Fees

MADISON, WIS., April 29—A state highway bill providing for a 5,000 mile road system connecting every county seat in Wisconsin has passed the assembly and awaits the signature of the governor. An increase of automobile license fees from $5 to $10 is one of the provisions.

Canada Expects To Buy 30,000 Cars

Sales for 1917 May Reach That Total—Farmer Is Best Buyer

MONTREAL, QUE., April 27—Canada is expected to buy 30,000 cars in 1917. Since 1914 some 20,000 cars have been sold annually in Canada. Last year the figures reached 28,000. The big automobile market is in the middle western provinces, where the farmer has become the best customer. The profits from the crops of the last 2 years have helped to swell the sales of the automobile industry in Canada. The three western provinces, Manitoba, Saskatchewan and Alberta, invested $45,000,000 in automobiles in 1916, and in tires and accessories over $7,500,000. The great increase in sales in the last 2 years means that every man who owns a car now makes two prospective buyers for some distributor for the coming year.

—

Cadillac Wins Honors in Japanese Army Tests

TOKIO, JAPAN, April 30—The Cadillac Eight, manufactured by the Cadillac Motor Car Co., recently won highest honors in a series of tests arranged by the Japanese army. Representatives of five American cars were invited to enter a competitive demonstration. When all had finished the officers asked each one to haul a nearby gun up a steep grade. The gun weighed 2½ tons. Three of the dealers declined to compete, the fourth ruined his frame in the attempt, and the Cadillac was then attached to the gun, got it under way in low gear, shifted to second speed and negotiated the grade.

—

Manly Truck Adds Equipment

CHICAGO, April 27—The Manly Motor Corp., maker of Manly trucks, has added a kerosene burning equipment costing $100 to its Models 30 and 50, 3000 and 5000 lb. trucks. Other equpiment includes electric starting and lighting, $125 additional; electric lighting only, $75 additional, and enclosed cab in place of seat, $35 additional.

—

Cassidy Adds Tenion Piston Ring

NEW YORK, May 2—The Edward A. Cassidy Co. will handle the sales of Tenion piston rings manufactured by the Du Bois Piston Ring Co. The Cassidy company has been studying Tenion rings which were formerly called Du Bois and submitting them to engineering tests for several months. The Cassidy line now comprises the Conophore, Kimball jack, Cassco tire pump, long horn, G-P muffler cutout and Tenion piston ring.

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Friestedt Enlarges Scope

CHICAGO, April 28—Friestedt Mfg. Co. is the new name of the Friestedt Rim Contractor Co. The change in name has been made to coincide with the larger scope of the company, which is now marketing what is termed a hydronizer in addition to its rim contractor. The hydronizer is a glass container which clamps to the intake manifold and permits small quantities of water, kerosene or alcohol to be drawn into the mixture to prevent carbon deposit.

—

Prest-O-Lite Wins Freight Increase Protest

WASHINGTON, April 30—The Interstate Commerce Commission has found in an official opinion that the proposed increased freight rating on coppered or nickeled cylinders by railroad carriers under a Southern classification order is not justified, and such increase has been denied. The proposed increase was protested by the Prest-O-Lite Co., Indianapolis, which showed that it shipped cylinders, generally empty, from Speedway, Indianapolis, to charging plants throughout the country, the principal one being at Atlanta, to be filled with gas and sent to consuming points.

Four styles of these cylinders, valued at about $15,000,000, are in use. The carriers contended that transportation conditions always present with coppered or nickeled cylinders and not appertaining to other cylinders justified an increased rate. The commission held that no reason exists for making a distinction as between cylinders coppered and nickeled and those not coppered and nickeled.

—

Dickson Urges Indianapolis To Put Clock Ahead 1 Hr.

INDIANAPOLIS, May 1—George M. Dickson, president of the National Motor Car & Vehicle Corp., has written a letter to Joseph E. Bell, mayor of Indianapolis, urging the mayor to issue a proclamation asking the people and manufacturing interests to set all clocks forward 1 hr. Mr. Dickson believes this should be done as a patriotic measure to provide another hour of daylight for persons who are tilling ground as a means of assisting the Government to prosecute its part in the war. According to Mr. Dickson by far the majority of the employees of the National company favor such an action.

—

50,500 Registered in Georgia

SAVANNAH, GA., April 27—To date 50,500 automobile tags of the 1917 vintage have been sold by the Secretary of State.

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Doble Agent in Detroit

DETROIT, April 30—The Owen, Graham & Starkweather Co. will market Doble steam cars in this territory. Its quarters are with the Owen & Graham Truck Co. Mr. Starkweather will have the active management and sales direction, but will also continue his present position as branch manager of the Buick Motor Co.

7000 Ford Cars in Argentina

Sell for $1,700—Big Sales in Camp Areas—700 Cars Behind in Orders

NEW YORK, April 28—A. H. Lloyd Davies, assistant to E. H. Hampton, manager of the Ford branch at Buenos Aires, Argentina, and who has been visiting in the United States for some weeks, returned to Buenos Aires a few days ago. Mr. Davies states that there are at present 7000 Ford cars in Argentina, and that his branch started assembling last October. The assembly branch has capacity for forty cars per day, but this number is rarely reached due to scarcity of materials. At present 230 men are employed in the Ford activities in Buenos Aires, these being connected with the assembly work, retail and wholesale, service, etc.

One year ago Ford cars were selling for $2,000 (Argentine pesos), but since assembly has been started the price has been reduced to $1,700 (Argentine pesos). Mr. Davies reports that it is possible to secure good labor for assembly purposes. His concern takes unskilled help and trains it, which is accomplished in a relatively short time.

Although agricultural conditions have been very poor in many parts of Argentina during the past summer, which ended a few months ago, the Ford company is behind 700 orders at present. In addition to selling touring cars it is disposing of many chassis which are fitted with delivery wagons. At present 85 per cent of the sales are going into the country or camp areas. There are at present seventy Ford dealers in Argentina and as many sub-dealers. Each year finds the territory of the dealers and sub-dealers reduced in area, notwithstanding which the sales for each is increasing. The Ford company is pushing forward its system of country-wide salesmanship the same as it so successfully accomplished throughout this country. While the Buenos Aires factory is serving only Argentina the Ford company is working the South American territories very carefully. It has at present three special men traveling practically all through Brazil organizing the field. While the Ford branch at Buenos Aires is assembling mostly cars of 60-in. tread at present it is expected that soon only cars with 56-in. tread will be produced.

—

Oppose Unjust Taxation!

(*Continued from page* 845)

chines are going to be content with the old model for a year or perhaps longer.

To-day the automobile industry is in no robust condition to absorb such a 5 per cent class war taxation as this. The automobile makers want to pay their share and are willing to pay it in the

form of excess profit taxes on their business as necessary. Under this excess profit tax arrangement the manufacturer pays proportionately to the government on his profits. If he does not make money he can scarcely be expected to carry his share and would not have to. Proportionately as he makes money he contributes to war taxation.

Ford Not Real Criterion

Unfortunately political Washington measures the automobile industry by the Ford annual statement. This has been known for a year or so. Heretofore it has been accepted, but not considered serious. To-day this estimate of the industry is serious and must be counteracted.

Ford is not and should not be considered a correct criterion of the industry. His business in proportion to others is greatly abnormal. The Ford business is practically without parallel. Washington fails to realize that too many of our automobile companies have been doing a large production business on too small, in fact ridiculously small capital. They have been able to do this so long as the curve of demand and production and prices was favorable. But with war, higher materials and decreased production and war taxes, together with slackening of demand, several will be face to face with financial situations that they thought impossible a few months ago.

These are days when the automobile industry must look the situation square in the face. The facts must be put in black and white. It is no time to depend too generously on to-morrow. To-morrow is too uncertain a factor. Nobody can properly gage it. The automobile industry must curtail.

Production Reduced

Already production is being cut down from 25 to 40 per cent by many important concerns and others will have to follow in the wake of them. Too many dealers are now stocked full of cars. The first quarter of 1917 was the biggest automobile production quarter of the industry. Manufacturers kept up production schedules and have loaded the dealers. These dealers find cars not moving as rapidly as they expected. Late spring weather is holding back many sales. A great many others are being held back because people refuse to make heavy investments in the present day, when prices for every commodity are going higher and higher. While cancellations are not very conspicuous at present, dealers report failure to make many sales which were expected to be closed weeks ago. Such conditions are general and should serve as warning to automobile manufacturers. These are not days of expansion but days of judicious contraction and protection.

The present time is particularly inopportune for class legislation of this nature. There are two reasons for this:

Reason 1. *The government has no right to resort to class legislation which taxes one industry and not others.*

Reason 2. *It is poor policy to attempt to place class legislation burdens on an industry at a time when for various reasons it gives indication of depression and slackening, such as the automobile industry does to-day.*

In many States consumers may have to face heavily increased registration taxes. In addition, in all probability, a 2 cent per gallon tax may be placed on gasoline. Some of these measures must become law. We are in war and have to raise approximately $2,000,000,000 per year and the automobile industry will have to bear its legitimate share, and bear is cheerfully.

Coffin Opposes 5 Per Cent Tax

Howard E. Coffin of the Council of National Defense, said to-day the automobile manufacturers of the country were united in their willingness to aid their country in the present emergency as far as paying a fair and just proportion of war taxes was concerned, but that they would protest against such a tax at the source as is reported to have been recommended by the sub-committee of the ways and means committee.

Mr. Coffin said such a tax, in addition to the excess profits tax, which is expected to be increased, would not be equitable from any viewpoint, and especially in view of the support the motor industry is giving the government. No hearings are to be held by the ways and means committee, and any action taken by motor interests after a bill is reported out will have to be in connection with individual members of Congress. Congress has always heretofore shown an inclination to treat the motor industry fairly.

—

France Feels Gasoline Shortage

CHICAGO, April 29—According to a cable received by the *Chicago Daily News*, strict measures are being taken by the French minister of supplies, M. Violette, for conserving the use of gasoline. Only 8 gal. a week is allowed to users of automobiles which do not come under the category of public interest, such as taxicabs, ambulances, etc. These cars are allowed 14 gal.

—

Studebaker to Build New Machine Shop

SOUTH BEND, IND., May 1—Plans for a new concrete and steel machine shop to be 225 by 576 ft. have been announced by the Studebaker Corp. The building, which is to be erected as soon as possible, will comprise only one-fourth of the entire structure which the company intends to build in the near future. When the entire one-story building is completed it will measure 428 by 1000 ft.

—

Fickling Adds Storage Department

NEW YORK, April 30—The Fickling Enameling Corp., Long Island City, has added to its plant a department for the storage of cars and bodies. Following are the rates: Closed cars, first month $12, additional months $8.50; touring cars and runabouts and chassis, $10 and $7.50; closed bodies, $8 and $6.50; touring bodies, $6.50 and $5. These prices include jacking up cars and supplying covers.

Harkness Takes Sheepshead

Pays Off $2,135,161 Mortgages on Speedway—To Manage It Himself

NEW YORK, May 2—Another interesting chapter in the history of the big Sheepshead Bay Speedway was written yesterday when the property was offered at auction. The sale was the result of a foreclosure auction brought by Harry S. Harkness against the Sheepshead Bay Speedway Corp. As a result Harkness is now in complete possession, on a bid of $1,300,000. The indebtedness against the property amounted to $2,135,161.86.

The property, which consists of the speedway, stands, buildings and extensive grounds, was offered in two groups. The first group contains that property exclusive of the speedway; the second group contains that property embracing the motordrome, ground, stands, etc. The property was finally knocked down to Harkness on the above bid.

Mr. Harkness, it is stated, will manage the affairs of the speedway himself. His 1917 plans are undecided. He has had several of his racers on the speedway lately, however, which practically indicates his intentions of entering the 1917 racing events.

—

Three Short Races at Cincinnati

CINCINNATI, April 29—The Cincinnati Speedway officials have substituted three opening races instead of the amateur event scheduled for May 30. There will be a special race for Fords at 20 miles with three cups, valued at $100, $75 and $50, as prizes. A stock chassis 20-mile race is scheduled with cups as prizes valued at $150, $75 and $50. There will also be a special invitation race of 30 miles for Class E non-stock cars. The prizes will be three cups, valued at $200, $100 and $75. These races will precede the 250-mile event.

A purse of $25,000 has been offered for the 250-mile race, divided into $10,000 for first; $5,000 for second; $2,500, third; $1,750, fourth; $1,500, fifth; $1,100, sixth; $900, seventh; $800, eighth; $750, ninth, and $700, tenth.

Four entries to date have been made, as follows: Ostewig Special, driven by S. Ostewig; two Super-Six Specials, entered by the Hudson Motor Car Co., and driven by Mulford and Vail; and the Omar Special, driven by Omar Toft.

—

Three Foreigners to Enter Cincinnati Races

CINCINNATI, April 30—Joseph Christiaens, Enrico Cagno and Jacob Scales have entered for the Cincinnati speedway race May 30. Christiaens is in the Belgian aviation corps and Cagno and Scales are attached to the Italian army. Christiaens will drive an English Sunbeam and Cagno and Scales will drive Fiats.

The Automobile

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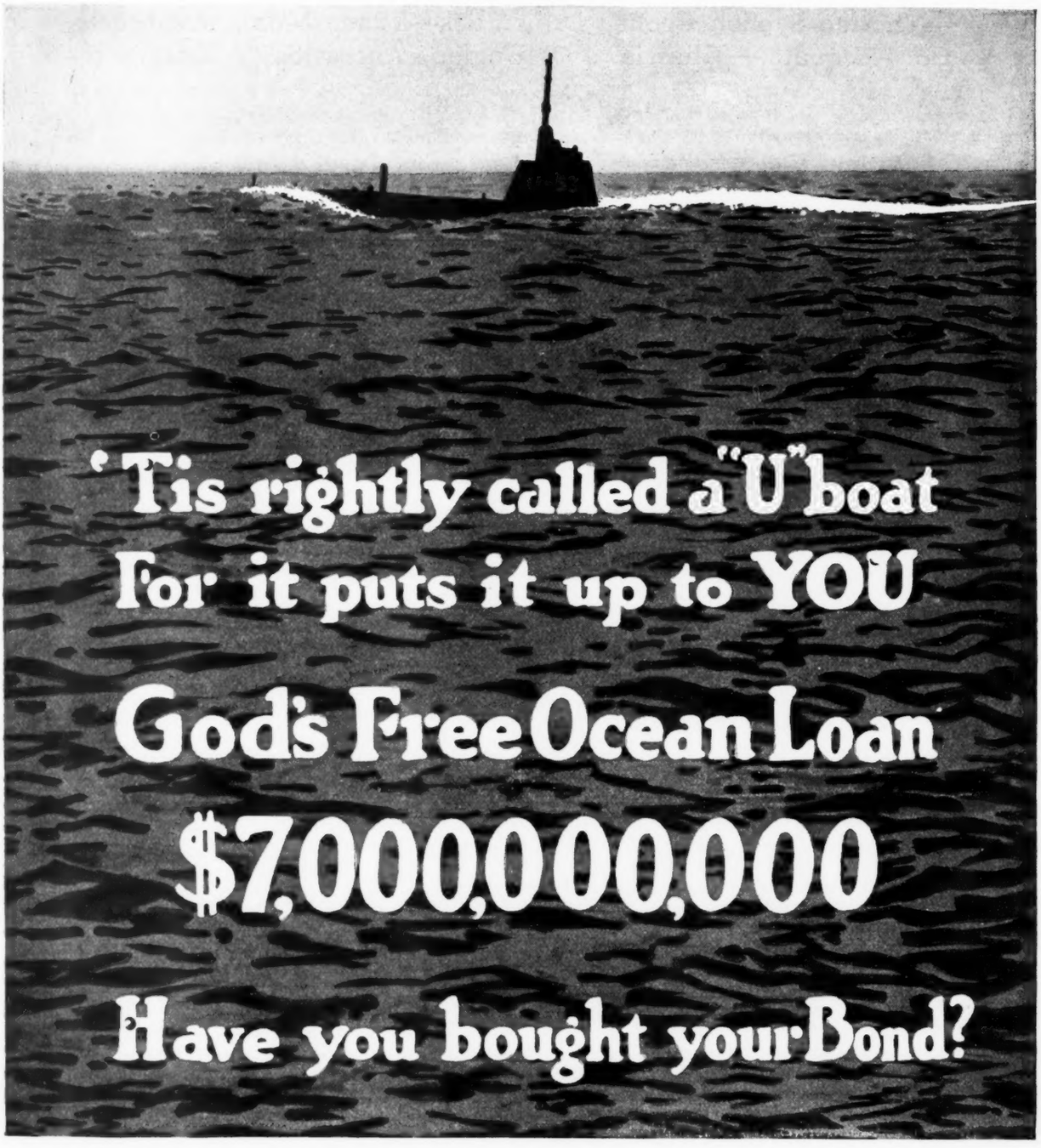
Doing Our Bit



THESE bonds are to be issued in all sizes from $100 up, it is understood. At the rate of $2 a week one of these bonds may be bought in a year. The entire issue of $7,000,000,000 means the equivalent of 70,000,000 bonds of the $100 denomination. To absorb this loan, America's first popular contribution to the expenses of the war, bonds must be bought by the population of the United States on the basis of $100 worth to each one and one-half persons in the country. Of our 105,000,000 people there are millions who cannot afford even the $2 a week required to buy one $100 bond in a year. It is up to "You" to absorb the surplus.

War Reveals Defects in Design

Clean-Cut Motor Design Important—Troubles with Lubrication —Thermo-Syphon Cooling Difficulties—Exhaust Manifolds Must Be Adequate — Chassis and Engine Accessibility Criticised

By W. F. Bradley

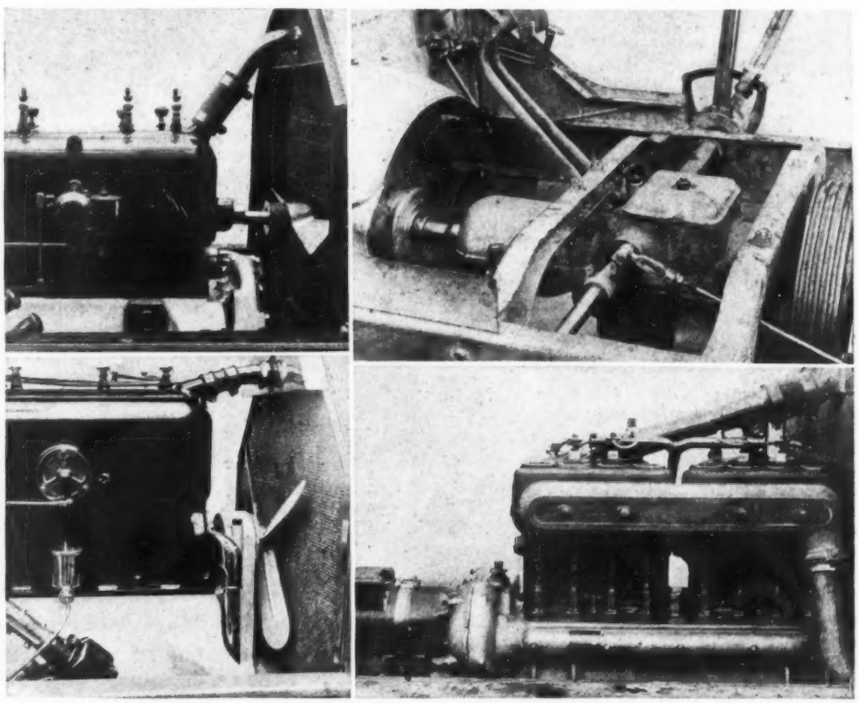
¶EDITOR'S NOTE—In this article Mr. Bradley, special correspondent of THE AUTOMOBILE with the allied armies, outlines in detail the chief troubles and defects brought out by war in the design of cars and trucks in the Italian service. During his work of several months as an ambulance driver, Mr. Bradley was in daily contact with army vehicles and the men handling them, so his knowledge of the subject is at once accurate and comprehensive.

INFINITELY more severe than the most difficult trials of automobile and motor-truck construction at the factories or in ordinary service is the great test of war. Moreover, special demonstrations of endurance, economy and performance usually start with a vehicle in good condition and manned by skilled drivers and mechanics. In war work, equal results must be attained with cars and trucks handicapped by a record of hard service and in the hands of mediocre drivers and without mechanical experts near to render repair service. A defect which can be tolerated in private service, because it is nothing more than an inconvenience, and can be prepared for and met under the most advantageous conditions, becomes a curse under active war work.

It is the intention in this article to point out some of the defects and weaknesses of Italian cars and trucks which have revealed themselves under active service. By this is not meant convoy work 15 or 20 miles behind the lines, where roads are good, shells are unknown, and, with proper organization, conditions need not be very much more severe than in private service. The experience covers vehicles which are constantly under fire. There are thousands of such vehicles on the various fronts of Europe. The expression "under fire" does not imply stretches of road on which shells are falling as thick as hailstones in a storm, nor has it very much in common with the illustrations prepared by artists thousands of miles from the front. Flying shell splinters are only seen by artists of imagination, but they are felt and heard daily, hourly by every automobile driver attached to the front-line forces. Working under fire does not mean that a car is disabled every time a shell bursts. Only mules and horses are irretrievably lost by splinters of shrapnel. An automobile may be within effective distance of hundreds of exploding shells, and, unless some essential organ happens to be hit, emerges none the worse for it.

The term does imply running over roads which can never be repaired, if we refuse to recognize the dumping of earth and bricks as repair work; it means going over those roads at a fast pace, for it is beyond human nature to keep the foot off the accelerator pedal when the whistle of incoming shells is heard; it means driving at night in such black darkness that even the glow of a lighted cigarette in the mouth of a mechanic on an approaching vehicle is helpful and welcome; it means garaging the cars in some wrecked courtyard probably inches deep in mud; it means no facilities for washing, other than the river or a stream, when business is slack; it means doing all repair-work in the open air, with shells passing overhead in both directions; it means satisfaction with a very meager set of tools.

Clean-cut motor design is very much more important to the driver in the war zone than would appear at first sight. The conventional L-head type, with inclosed valves, bolted-on ribbed exhaust manifold—a straight length, integrally—cast intake manifold, with carbureter bolted direct to the cylinder casting, magneto and pump driven



Upper left—Here rear wheel brake adjustment is correctly placed under the floorboards. Upper right—A neat design of truck engine. Fan does not sweep a sufficient area of the radiator. Lower left—A good example of valve stem accessibility, but exhaust is restricted by sharp bend in manifold—this is almost inevitable with dashboard radiator. Lower right—A good example of clean Italian design. A Spa truck motor with water pump in cylinder casting and fan driven off same shaft

An ambulance with a broken axle about to be towed by a truck

from a cross shaft in front of the motor, and a belt-driven fan, constitute the cleanest motor, the most accessible, and the easiest to maintain. A motor of this type, which can be cleaned in 5 min. with the aid of a kerosene brush and a rag, is much more likely to be kept in proper condition by the average driver than an engine of complicated and inaccessible design.

Clean-Cut Engine Design Important

The valuable features of a valve-in-head motor are fully recognized, but they entail considerably more work than the type just described. There are eight push rods which call for very much more frequent adjustment than the inclosed tappets of the L-head motor. There are eight rocker arm ball joints which must be oiled once a day at least; there are four valve rocker shaft grease cups which also need daily filling. In hot weather, and if poor quality grease is given out, the lubricant will liquefy and disappear at such a rate that the cups have to be filled twice a day. This is unnecessary labor. On some engines the governor and timing gear housings have to be filled separately. This is a small matter on peace service, but it is very objectionable on strenuous war work. There is no necessity for a couple of long small-diameter breather tubes which also act as oil fillers. A very much better arrangement is a single big-diameter filler which also acts as breather. This naturally raises the question of oil control. The method of determining the level by a cock is not satisfactory, for if it is inside the mudpan it cannot be seen, and if outside, the mouth of the cock is very quickly coated with mud and rendered useless. A float and indicator arrangement was also found unsatisfactory owing to its liability to wedge, and on more than one occasion the float came adrift and was battered out of recognition by the connecting-rods. A float with a vertical rod was also unsatisfactory, for unless protected by a tube the rod was liable to be bent or broken. The most satisfactory method observed on the Italian front was that adopted by Fiat, and consisting of a big-diameter filler and breather, with a hinged, clip-down top; and below it, at the correct height, another mouth with a hinged cover, allowing the driver to look into the crankcase. To fill, the two lids were opened, and it was impossible for the driver to make any mistake about the level or to put in too much oil. It would overflow from the lower inspection hole when the correct height was passed. The only defect of this arrangement was the absence of a filter in the mouth of the filler. This filter should have a big surface and be not very easily withdrawable, so that drivers will not be tempted to pour oil in direct.

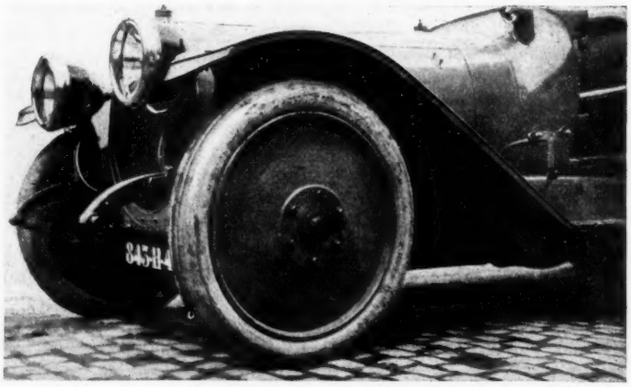
War experience shows that an oil indicator is unnecessary. Glass sight-feeds, for instance, were absolutely useless, for after a few days the glass in one of these was so dirty that the flow could not be observed; in any case, it was not visible from the driver's seat, and it was very liable to be broken by an accidental kick with the foot. All the Italian cars used a glass-faced pressure gage, which generally worked satisfactorily, although the small-diameter copper pipe would sometimes fracture, or the glass be broken. Between 40 and 50 Buicks and G. M. C.'s have been working on the Italian front for a year and a half without any dashboard indicator, or without any attention being paid to it, and with both American and Italian cars the writer never heard of a single case of oil-pump failure. What is needed is a very simple and reliable oil level, but the oil indicator can be abolished as unnecessary. A few firms have realized this, the French Darracq, some Delages and Panhards, for instance, now being without indicators.

It is an easier matter to get drivers to verify the oil level than to keep an eye on the oil indicator; certainly the man who would not trouble to verify his oil would not watch a dashboard indicator. Even on war service, cars are not run continuously for such a length of time that the oil supply is liable to become exhausted. On some of the Italian cars the oil-pressure indicator was a danger, for owing to partial choking of the filter on the oil line a high pressure might be recorded while very little oil was getting through to the bearings.

Oil Filter Essential

A filter on the oil line is very essential for war work, owing to the poor quality of oil usually supplied and the amount of foreign matter likely to get into it accidentally. Fiat has a very good filter, mounted just behind No. 4 cylinder, and consisting of an outer coarse and an inner fine gauze. The objection that may be brought against it is its inaccessibilitly, it being necessary to remove the floorboards, which are screwed down, in order to take it out. It is certain that unless very efficient management prevails, filters in the base chamber and around the pump will not be removed for cleaning. Several burned-out bearings have been traced to choked filters.

Besides being in an inconvenient position, the oil pump and filter were frequently difficult to dismantle. The



The type of steel disk wheel which has proved very efficient

pump drive consists of a spring which fits in slots in the pump spindle and in the skew drive from the camshaft. The spring is difficult to erect, as the casing around it does not form a guide. It was found that the most practical way to erect this was to stick the spring into position in the top slot, with thick grease, and then carefully enter the pump into position. In some cases these springs were incorrectly assembled, with the result that on starting they would not only fail to drive the pump but the spring itself would break. This arrangement is unsatisfactory in a workshop; it is not a job to be undertaken lightly when there is no cover for the car and the ground has been plowed up until it is several inches in mud.

A Ford on a mountain pass within rifle fire of the enemy trenches

If designers and manufacturers thoroughly understood war conditions they would make provision for the carrying of spare oil in such a position that it would be kept warm from the heat of the motor, could be readily passed into the base chamber, and small quantities drawn off as required. No car was encountered on the Italian front in which this was done in a really satisfactory manner. On many cars it would be an easy matter to have a reserve oil tank on the front face of the dashboard, with an oil lead direct to the filler and breather. This ought to be designed with the car and not put on later.

Block Casting for Engines

The writer is decidedly in favor of block casting for all, but especially for big motors. The difficulty of entering four pistons at one operation is more imaginary than real, for although there may not always be much tackling in the workshops at the front, there is always plenty of labor. It is important, however, that the mouth of the cylinders be tapered to give an easy entrance for the pistons.

Thermo-siphon cooling has not proved a success on war service. All Fords going into service in Italy have a special big-capacity V radiator, yet it was impossible to take these cars over many of the lower passes in summer without the water boiling away. The only thermo-siphon car encountered on this front which gave satisfactory service under strenuous conditions was a Metallurgique touring chassis converted into an ambulance. This car did not have a fan other than the flywheel. A Crossley, similarly converted, could never be kept cool on mountain roads even with the aid of a fan. Renaults kept sufficiently cool under normal roads but lost water on heavy climbs. English Daimlers with pump gave trouble with overheating in the mountains. Generally, English cars were inadequately cooled for mountain work. The motor on an American truck was rather overcooled. During the hottest portion of the summer, on the plains at the head of the Adriatic, it was rarely that the temperature of the water rose higher than a good average, while at night time they were running too cold, as shown by the Boyce Moto-Meter. Others, on the other hand, were inclined to run too hot, and although the writer found from experience that the water need not boil even under strenuous conditions, the margin was so small that many drivers of lesser experience could not get over the hills without adding more water. The Fiats showed very careful designing in the matter of engine cooling, for with fan properly working it was impossible to make them overheat under any circumstances. With the fan belt off they would overheat in a quarter of an hour on level roads. These remarks refer to the models with belt-driven and not with flywheel fan.

Considering the conditions, very little radiator trouble developed. On a few makes too rigid a mounting was adopted, with the result that the radiator was strained, and leaked after working on very rough roads. This straining was traced in several cases to the tie rod from the dash to the top of the radiator; with this rod removed, the radiator carried in trunnions, and a very flexible rubber connection from the top of the cylinders to the header tank, all trouble was avoided. The later Fiats had an exceedingly flexible mounting, for the trunnion bearings were rubber lined and the rubber connection to the cylinder outlet pipe allowed the top of the radiator to be moved at least half an inch. It is doubtless due to careful design in this respect that so little radiator trouble developed on this make.

Finned-Tube Radiators Predominate

Cellular radiators are entirely out of favor on the Italian front, the great majority of cars and trucks having the finned-tube type. The Gallay radiator, however, used by Lancia, gave very efficient service. In a large number of cases the finned-tube radiators were fitted with a false front to give them the appearance of a cellular type. This is done by Fiat, who has the false front for the touring models and finned tubes without disguise for trucks. Trouble developed in several cases by reason of the front edge of the motor hood rubbing on the radiator until a hole developed. This was particularly the case with a very flexibly mounted radiator; the remedy, of course, is simple.

Both V-section and flat fan belts were used, but neither showed any great preference. The uniting of the fan-blade tips by a ring was sometimes disadvantageous, for it prevented the belt being put on after it was sewn or riveted. In these cases the belt had to be riveted while around the pulley. There is very much in favor of the Spa practice of mounting the water pump in the cylinder casting and driving pump and fan from one shaft, without the use of a belt. It would be a very easy matter to incorporate a clutch with the fan drive, thus allowing the fan to be put into or out of motion as desired. Not enough attention was always paid to complete drainage of radiator and waterjacket. So far as the former is concerned, the best arrangement observed

was a V-section sump, with a tap in its base, at least a couple of inches below the bottom of the radiator. On some makes there was no drain on the pump housing, with the result that water lodged there, froze, and caused the pump drive to shear.

Accessories Demanded by War Conditions

On much of the work at the front drivers are never aware whether they are leaving their cars for a few hours or for the whole of the night; thus it is desirable to keep the water in the radiator as long as possible. This can only be done if a complete tight-fitting cover is provided for both radiator and hood. Drivers were not long in devising these covers themselves; but some makers now supply them with the car. Another useful accessory is a safety kerosene lamp to place under the hood when the car has to stand in the open for several hours.

War service does not bring forth any very strong claim for variable cooling, but it does show that the most strenuous conditions have not always been anticipated, with the result that there is a rather general tendency toward overheating under the most severe conditions, and also a tendency for the lower portion of the radiator to freeze on winter service over some of the Alpine passes. A thermostat is a rather delicate instrument to fit on a war-service truck. A more general practice, in Europe at any rate, is to get carbureters which will work under a wide range of temperatures. Aeroplane experience has shown that this can be done. Motors are required to operate at 50 deg. Cent., and, a few minutes later, after a rapid gliding descent, to pick up instantly and develop full power with the cooling water at only 5 or 6 deg. It is found better to get a carbureter capable of doing this than to fit variable cooling. This should be possible on truck work, where the rate of cooling is much less rapid. It would be an advantage, however, to provide shutters for the radiators, these shutters to work from the bottom upward, so as to allow protection to be given to a required area of the cooling surface.

Two-Part Mudpan

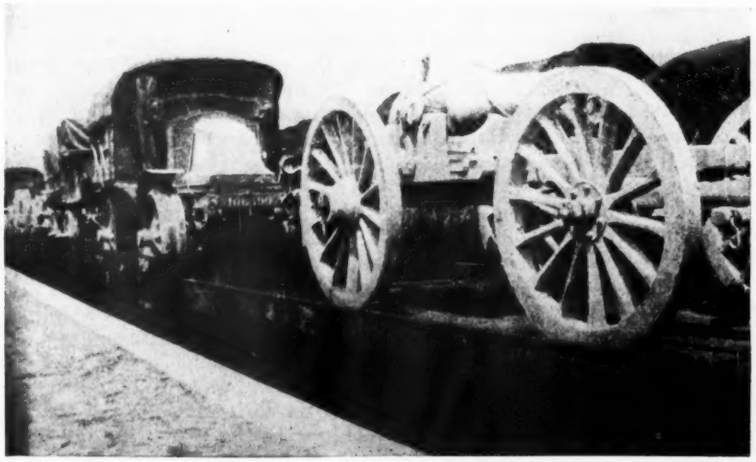
This naturally leads to the question of underpans. It is a rather common Italian practice to use two underpans, the forward one protecting the motor and ending only an inch or so behind the flywheel, and the second one being under the gearbox and upswept at the front to allow a free exit of air from the motor housing. This arrangement is not satisfactory—it is decidedly unsatisfactory with flywheel fans—for while the hot air from the engine is got rid of with the least obstruction, under very muddy road conditions an immense amount of dirt is flung up, caught by the flywheel and scattered in every direction. It is not uncommon, under certain road conditions, for cars to be stopped from this cause alone. The most practical arrangement is for the mudpan to be in two parts, overlapping and extending from the radiator to behind the gearbox. The best arrangement is an attachment by spring-controlled bolts, the pan being attached not to the frame members but to horizontal sheet-metal guards either screwed or riveted to the frame members. With this design, one side of the pan can be lowered as easily as opening a door, and the whole pan can be taken down or replaced by one man in a minimum of time. It is rather surprising that at this day so many underpans cannot be dismounted or replaced except by a couple of men and at least an hour's labor.

External Manifolds Save Cylinders

Some trouble was experienced with cars having integrally cast exhaust manifold. There were some cases of broken cylinders owing to excessive overheating at the exhaust manifold, which trouble was entirely avoided when the manifold was external. With a straight length of manifold there was the same valve accessibility as if it were cast with the cylinders. The big Fiat tractors suffered somewhat from the restricted size of the exhaust manifold and pipe. It was not at all uncommon to meet these tractors at night time, hauling heavy guns, with the whole of the exhaust pipe and muffler glowing red. The same applied to the Soler single-cylinder, two-piston tractor. It is certain that this defect did not reveal itself under peace conditions.

Shims for connecting-rod bearings gave a lot of trouble. It was the practice on some engines to set the bearings up as tight as possible, but after a very short time the shims would hammer into the white metal, for there was not a phosphor-bronze backing the whole length of the bearings, and the bearing would become loose. In some of the repairshops so much annoyance was experienced that a new phosphor-bronze shell was turned up and the bearing set up without shims, as is the general European practice. No shims are used on Italian vehicles, and their presence on American motors always met with the disapproval of the mechanical staffs. There were numbers of cases of melted connecting-rod bearings provoked by this looseness, for which the shims were primarily responsible. With this exception, the bearings were well proportioned on American motors. Main bearings gave little trouble. The few cases of failure which were reported were the center-bearing, the supply of oil to this bearing being somewhat limited for strenuous service. The same trouble was experienced on some of the European cars, and was overcome by increasing the supply of oil at this point. Forced feed to the main bearings is certainly to be recommended in preference to merely circulating systems; no trouble was experienced with troughs for connecting-rod bearings, however.

For ignition purposes the entire Italian army makes use of high-tension magneto without any batteries either as an auxiliary or for ease in starting. The Delco system found a place on the Buicks only. It proved itself very satisfactory. A starter on an army vehicle appears to be an altogether unnecessary refinement. Regulations call



Renault four-wheel drive tractors with the guns they usually haul being moved to a distant part of the front on flat cars

Automobile drivers' home at the front. The house is within sight of the enemy, but rooms being dry it forms very desirable quarters

for two men on every car at the front, and as they are both supposed to be capable drivers, and are dressed and equipped for their work, it is no hardship to get onto the road and crank a motor. There are half a dozen conveniences most army drivers would ask for in preference to a mechanical starter.

Accessibility of Parts Essential

American magnetos, on the whole, gave more trouble than battery ignition sets. For the first 6 months they were trouble proof; after that they gave endless trouble. Construction generally was poor, the machines demagnetizing, platinum contacts wearing out, and screws coming loose. It was not at all an unusual thing to take some magnetos out of the chassis four times a week to true up the platinum contacts.

Right here it is necessary to mention the greatest fault found with a motor having the pump and magneto set alongside it, the contact-breaker box facing toward the rear. By pulling out the floorboards, a contortionist might be able to see the contact points, but he could not adjust them while the magneto was in the chassis. To dismount, it is necessary to unscrew four studs passing through the magneto platform into the magneto base (two were really quite sufficient). A mechanic with a small hand and a correctly shaped wrench could get these studs out without disturbing the underpan. A heavy-fisted man had to take the pan down, and might be anything from 1 to 3 hr. on a job which ought not to have occupied more than a few minutes. The job could have been very much simplified by using a flexible band fastening for the magneto; better still, the pump and magneto could have been driven off a cross shaft, with the contact-breaker box pointing outward and above the level of the frame members, thus making adjustment a very simple matter and capable of being performed without taking the magneto off the motor. The writer had in his charge for 4 months a Berling magneto on a Fiat motor; it gave no trouble at all, and was running very satisfactorily when the car was turned over to another person.

For trucks with magneto ignition only, and these constitute the great majority of the Italian fleet, variable advance is to be preferred; but the amount of advance obtainable should be just sufficient to allow full advance to be given and maintained when the motor has warmed up and is in good condition. As all driving is done with the accelerator pedal, there is no necessity, on army work, for throttle control on the steering wheel. All that is required is an easily operated minimum running adjustment either on the carbureter itself or on the dash, for it is not often that a cold motor will start on the minimum gas required to keep it running when once warmed. The abolition of the throttle lever is one little step toward simplification. One technical report which dealt largely with American chassis used on ambulance service in Italy suggested an additional air control so as to allow pure air to be aspired when descending long hills. This is, no doubt, useful in the hands of a good driver, but the real reason for the proposal was that the brakes on these cars were not efficient. The correct remedy would have been to improve the brakes.

Practically all Italian cars and trucks are fitted with pressure-feed gasoline, the pressure being taken from the exhaust, or in some cases obtained from an air pump. The system is very unsatisfactory. Gravity would be better, but it was not always an easy matter to locate the tank in a high position to give a flow on hills. Certainly the vacuum feed would have been a great improvement. Where exhaust pressure was used trouble was experienced in sooting and choking of the pressure valve, also by reason of the condensation of water in the manifold, this water being passed through the air line into the tank. In one set of Fiat cars, with pressure-fed tank under the seat, and gasoline supply drawn from the base of the tank, endless trouble was experienced with water. Within an hour of everything, including tank, being taken down, cleaned and dried, water would be found in the carbureter. This was inevitable, for condensation from the manifold caused the water to travel to the tank, and it came out at the lowest point and went to the carbureter. It could have been cured by bringing the outlet pipe through the top of the tank instead of the base, using this old outlet as a water drain-off. But as no copper pipe was immediately available at the front, the connection to the manifold was broken and pressure put on the tank by means of an ordinary tire pump mounted vertically by the driver's side. A single stroke of the pump about every half hour was quite sufficient to maintain pressure.

Tire Pumps to Increase Fuel Pressure

It was often found that the auxiliary hand pump on the dash was quite insufficient to maintain pressure if the exhaust pressure or air pump failed. Thus quite a number of drivers fitted up a tire pump on the dash and got all the pressure they required in two or three strokes. It is important that there should be a cock on the gasoline line just back of the carbureter, so that it is not necessary to crawl under the car to stop the flow if the line has to be broken. On one of the Fiats mentioned above as giving trouble owing to condensation and water in the carbureter, there was no such tap. Thus, with the tank under the seat, and gravity flow while on the level, it was necessary to crawl under to shut off the flow. One incident in this connection may be mentioned. The driver was crossing a partially wrecked bridge, under shell fire, when the carbureter choked owing to the presence of water. The driver, who was alone, had first of all to get under the car, then take down the gasoline line, clean out the filter and jet, and, after assembling, to again crawl under the car. The automobile was in view of the enemy all the time, shells were falling around, and other drivers, who had no desire to loiter at such a spot, were not complimentary to the man who had partially blocked the bridge. It is not necessary to repeat what the driver said about the designer of that feature on the car.

(To be continued)

Best Gasoline Exported

British War-time Fuel Much Superior to Average on American Market

By A. Ludlow Clayden

AT the hearing held by the Bureau of Standards and the Bureau of Mines, in Washington, Jan. 25 and 26, where the representatives of the oil industry met with those of the government to discuss the fuel situation, it was once or twice asked just what sort of fuel is now being exported, and no very definite answer was forthcoming. In a recent issue of *The Motor*, London, the chart shown herewith was given, this having been plotted from tests made by a well-known chemist from samples of the best-known brands of gasoline now on the market in England.

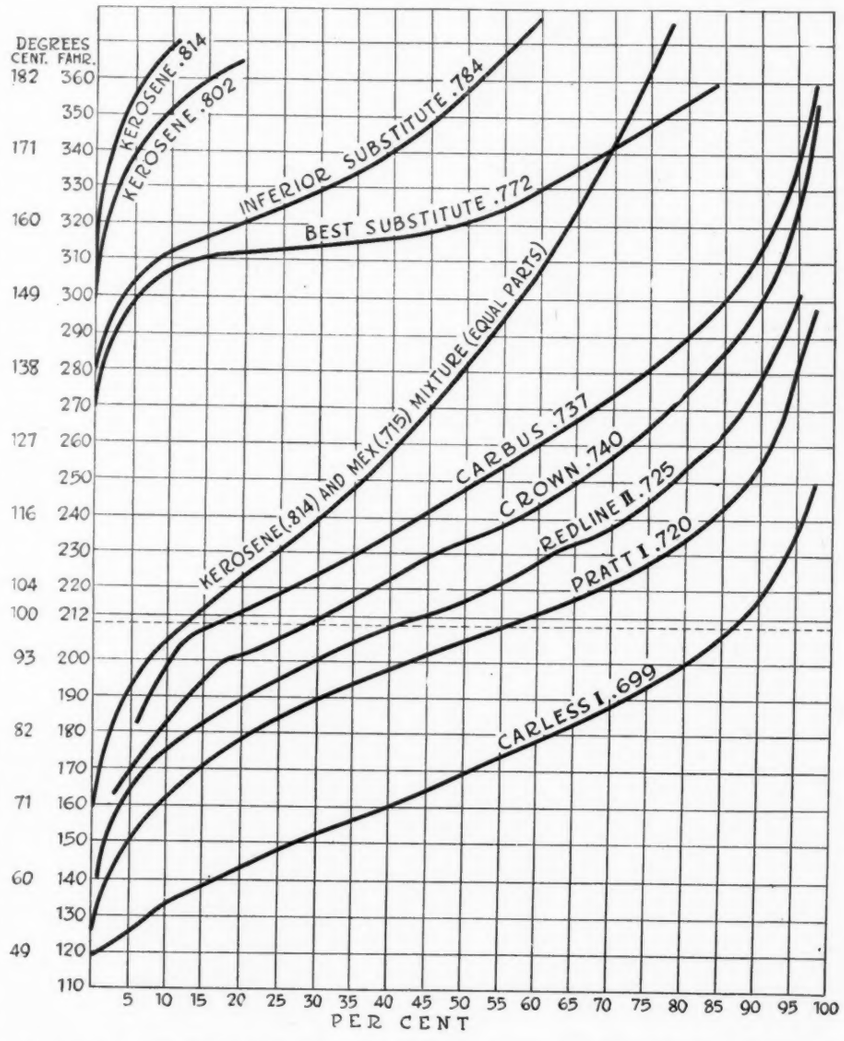
Since the war, or rather since restrictions on the consumption of fuel, a number of fuels have been put out as "substitutes." These are cheaper than gasoline, and are supposed not to be quite so good, but they are distinctly lighter than kerosene. To explain names on this chart, it has always been the practice in England to sell gasoline in sealed 2-gal. cans, and it has always been sold under a brand. The Anglo-American Oil Co., which is a branch of, or in some way connected with, the Standard Oil Co., has one series of brands; the Shell Transport Co., whose source of supply is the Java and Sumatra fields, has another series. There are various independent makers. Mex, the writer believes to be a Russian or Roumanian oil; Carless has always been the highest grade fuel, and more expensive than any other kind. As a matter of fact, for a good many years past, even before the war, there were only a few places where it was possible to purchase Carless.

The accompanying chart from *The Motor* covers nearly all the important brands, because, although there are more than those shown, it is explained that the range for the commercial fuels lies between the limits of Pratt I and Carbus.

Taking Carbus as being heaviest, we note that its starting point is around 180 deg. Fahr. and the 98 per cent point, which is practically the same as the end point, 360 deg. Redline II, which is probably as fair an example of an average British fuel as one could obtain, has a starting point of 140 deg. Fahr., and presumably an end point of about 320.

These starting points compare more or less equally with the American gasolines, but it is doubtful whether many fuels to be bought on the open market this side of the Atlantic have an end point below 400; and it is a well-known fact that many commercial gasolines have an end point of 450 or higher.

The curve on this page marked as a mixture of Mex with kerosene, is much more like an ordinary American gasoline.



Volatility of automobile fuels—For all practical purposes the curve for Pratt I also represents Carburine I, the curve Redline II represents Carburine II, Mex, Redline I and Shell I; similarly the curve for Crown represents Shell II, Pratt II, Carburine III, and Taxibus

Preserving Car Finish on Driveaways

TO PRESERVE the body finish while driving cars from factory to salesroom J. C. Kardell, vice-president of the Kardell Motor Car Co., St. Louis, recommends the application of a liberal coating of olive oil before starting and washing the car promptly after its arrival. The Kardell company recently drove a number of Reo cars direct from the factory in Lansing, Mich., to its salesrooms in St. Louis, in this manner and found this treatment of the bodies very successful.

Holley Kerosene Vaporizer Ready

Manufacture on a Large Scale To Be Undertaken at Once—Type for Ford Model T Cars Described in Detail, Including Its Installation and Operation

HOLLEY BROS.' kerosene vaporizer, which has been under development for some time in this country and of which a large number have been shipped abroad, is now ready for the American market. Representatives of THE AUTOMOBILE have been given the first opportunity to view the new Holley instrument on test and in operation, and the Holley Bros. Co. is ready to begin the manufacture of this unit on a large scale.

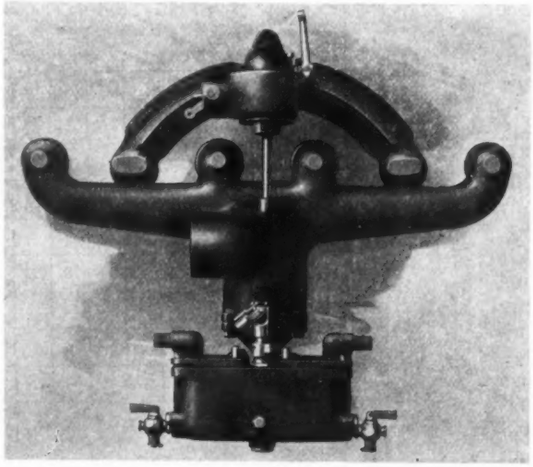
It has been recognized for some time that we have either to come to two fuels—kerosene and gasoline—or else take a straight-cut product which will be far more closer to the characteristics of present-day kerosene than those of gasoline. Therefore, the development of successful kerosene vaporizers does not necessarily mean that we shall have both kerosene and gasoline, but is far more significant because of the ability to use lower grades of fuel successfully. The Holley carbureter will use kerosene distillate, benzole, gasoline, or any hydrocarbon, with final boiling point below 600 deg.

The Holley vaporizer model 212 is especially adapted to Ford model T cars. It is designed to start on gasoline and after 1 or 2 min. running to operate on kerosene. The primary principle of the use of kerosene in the Holley instrument is the pre-heating by the exhaust temperature of an extremely rich mixture of kerosene and air, which is subsequently leaned out by the addition of auxiliary cold air. The Ford model sells for $22 complete, $3 being allowed for parts removed from the car.

Referring to the accompanying illustration, which shows a section of the new instrument, kerosene and gasoline enter their respective float chambers through ordinary float valve mechanisms. From the float chambers, either fuel, depending upon the position of the shifter valve *V*, passes through the adjusting needle valve *N*, and through a jet *J*, at the top of which it is atomized by an air blast induced by the suction of the motor, the air entering at *A*1. This is really an aspirating tube, but it has such a small area that the quantity of air admitted is only a small fraction of that required for combustion. This produces an exceedingly rich mixture.

This rich mixture of atomized fuel with the primary air is carried upward through a vaporizing tube *T* seated in the exhaust manifold. It will be noted that this tube is coiled so as to absorb the maximum amount of heat from the exhaust, the temperature reaching 500 deg. Fahr.

From this coil the rich mixture is led directly to the mixing chamber through the stuffing box *B*, where additional air is taken in through the air valve *A*2, which puts the mixture into its proper condition for combustion. The opening of the air valve in the mixing chamber is governed by the suction of the motor and by the opening of the throttle valve. From the mixing chamber the mixture in correct proportions is drawn into the engine cylinders through the inlet manifold in the usual way.



Exterior view of the Holley kerosene vaporizer for Ford cars, showing the manifold construction for pre-heating the mixture

In order to successfully handle the kerosene it is necessary to use a slightly lower compression than that employed in the standard Ford engine. This reduction in compression is accomplished by substituting a low compression head on the cylinders, which brings the compression from about 60 per sq. in. gage down to about 48 per sq. in. gage. It is possible with the kerosene outfit to secure a maximum speed of about 40 m.p.h., and on the testing dynamometer the maximum horsepower is about 20 per cent less than with gasoline. As regards performance, however, this difference is not noticeable commercially. A test witnessed by a representative of THE AUTOMOBILE showed a Ford car operating successfully at 6 m.p.h. with excellent acceleration upon opening the throttle from this speed on high gear.

Directions for the application of this instrument to the Ford T car and for the operation of the Ford car when so equipped are as follows:

To apply the Holley model 212 vaporizer to Ford model T cars with left hand drive, proceed as follows:

Attach the complete assembly to the motor, using standard gaskets, collars and clamps for this purpose. Be sure the connection of the vapor tube *T* to the mixing chamber is not loosened, as it is necessary to maintain a gastight joint at this point.

Replace regular exhaust pipe with longer one with special bends to attach to connector *C*, using a standard Ford clamp nut for this purpose.

Replace standard cylinder head with the special low compression head, using specially furnished long cap screws.

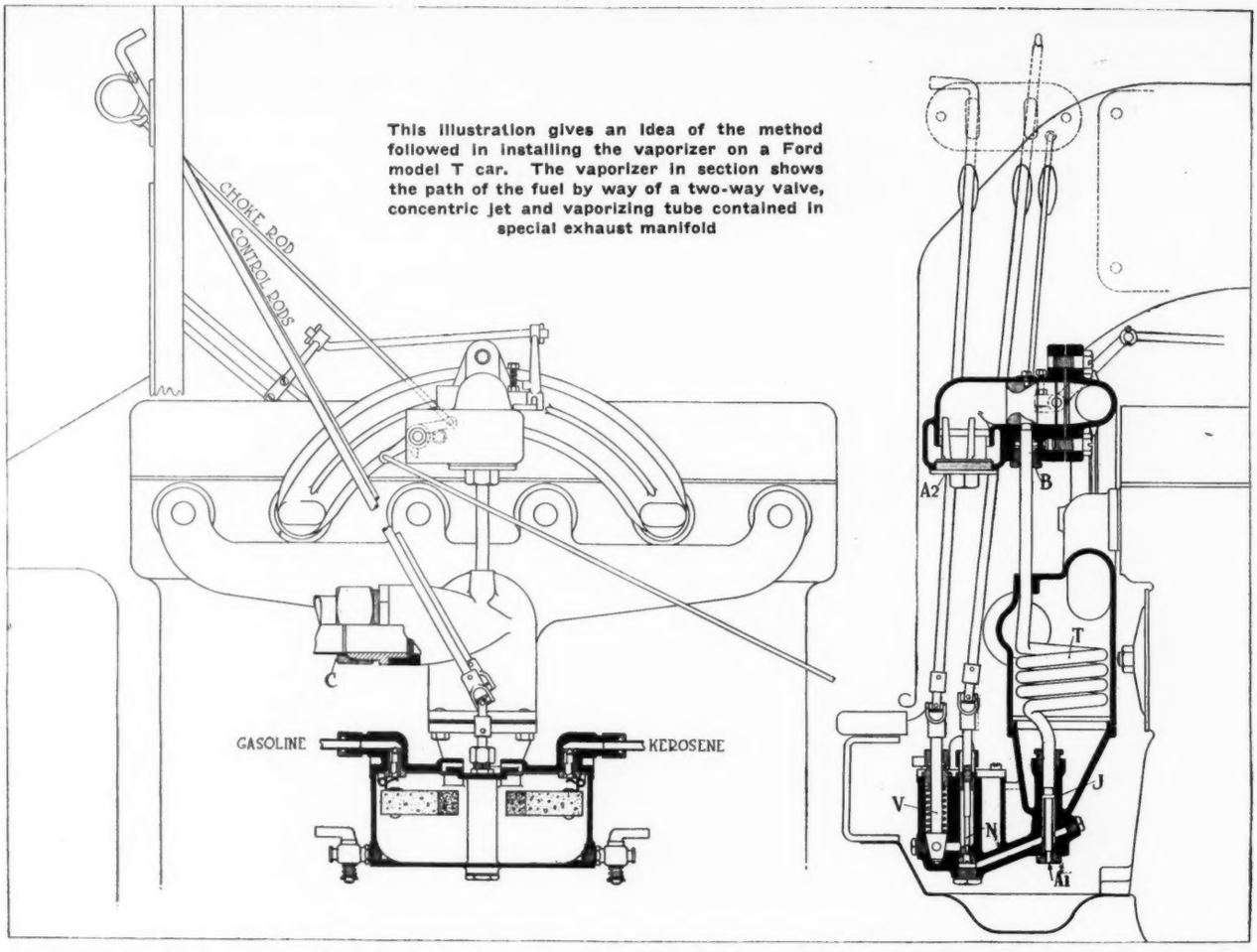
Replace the standard gasoline tank with special two-compartment tank to carry the main supply of kerosene and a small quantity of gasoline for starting purposes.

Connect the two fuel tanks to their respective float chambers, using standard Ford connecting nuts and special lengths of tubing.

Attach dash-plate so that hole for the air shutter wire is just above the lower edge of the original adjusting rod hole in the dashboard.

Use the plate in this position as template for drilling two holes in dash for control rods, as illustrated.

Pass fuel adjusting rod and shifter valve rod through these new holes in the dash and connect them to their respective universal joints by pinning them in place with the small split cotterpins furnished for this purpose. Be sure that the ends of the cotters are bent over so they cannot interfere.



This illustration gives an idea of the method followed in installing the vaporizer on a Ford model T car. The vaporizer in section shows the path of the fuel by way of a two-way valve, concentric jet and vaporizing tube contained in special exhaust manifold

The handle of the two-way valve rod must point toward the word Gas when the stop lever on the shifter valve is against the forward stop screw.

Place the throttle rod on throttle lever and make necessary adjustments by means of location of lever to allow throttle to open and close properly.

Pass choke wire through the hole in the dash plate and connect it to the upper end of the intake shutter lever so that with the shutter open, the wire handle clears the dash plate by about ¼ in.

Pass the priming wire through the hole below the right hand side of the radiator and connect to lower end of intake shutter lever, leaving the handle clear of the radiator by about ¼ in.

Operation of Holley Vaporizer

Fill small section of fuel tank with gasoline and large section with kerosene.

Turn two-way cock handle to gasoline position, close the needle valve *N* by means of handle, and then open this valve 1½ to 1¾ turns.

Open shut-off valves in both fuel lines.

Move throttle control lever 2 or 3 notches from the closed position.

Set spark lever in usual place for cranking.

Turn ignition switch to "On" position.

Crank motor, at the same time closing intake shutter by pulling priming wire. This operation is the same as when starting the motor with an ordinary gasoline carbureter.

After the motor has run 1 to 3 min. on gasoline, turn the two-way cock handle to kerosene position. If, after an interval of a few seconds, motor tends to decrease speed and stop, pull and release instantly, priming wire projecting through the radiator, or choke wire projecting through dash; *i. e.*, close the air intake shutter momentarily. The motor should then run satisfactorily on kerosene.

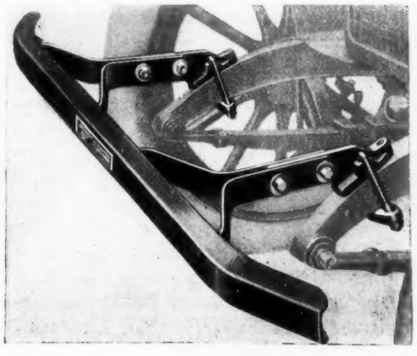
Adjust throttle stop setscrew so that motor runs at proper idling speed when hand throttle control lever is in closed position.

Adjust needle valve by handle as the same adjustment would be made for the standard gasoline carbureter.

Stewart-Warner Adds Bumper

CHICAGO, April 30—The Stewart-Warner Speedometer Corp. has added a bumper to its list of accessories. The new product is called the Autoguard. It is simple in design and contains only five prime parts in its construction—the guard or channel bar, two springs, and two heads or frame connections. The shock-absorbing members consist of full elliptic springs, which may be adjusted to fit various widths of frames without making it necessary to drill holes in the channel.

The frame brackets, or attaching members, are universal and fit practically any make of car. Provision is made for automatic adjustment by means of hook ends on the bolts.



Stewart Autoguard, recently added to the list of products manufactured by the Stewart-Warner Speedometer Corp., Chicago

Detroit Purchasing Agents Join National Body

Organize Branch of National Assn. of Purchasing Agents —Movement Promoted by THE AUTOMOBILE—Big Car, Truck, Parts and Accessory Makers Represented

By J. Edward Schipper

DETROIT, April 27.—Several leading purchasing agents of the Detroit automobile and parts factories have formed a local branch of the National Assn. of Purchasing Agents, the local branch being for the general benefit of purchasing departments and to develop co-operation among purchasing agents, the same as has been done in salesmanship and engineering. Last night's organization meeting at the Detroit Athletic Club afforded a good opportunity to air many of the abuses to which the purchasing field is a victim, and suggested plans how these abuses might be corrected.

The National Assn. of Purchasing Agents, which is now in its infancy, has six local associations, Baltimore and Syracuse having recently been added. Detroit is the latest recruit. The association will hold a convention at Pittsburgh Sept. 25 to 28.

While little has been said regarding organization among purchasing agents, it has become generally understood that many factors in the purchasing-agent field have made co-operation with some national association necessary. The standardized catalog has been advocated as one of the activities of such an organization. To-day the multiplicity of varied sizes of catalogs, many without specific information, has worked an injury rather than a benefit. The purchasing agent is subject to numerous abuses, among which might be mentioned the unfair list, made up of names representing sources of supply known by purchasing agents to be constantly giving trouble. Such a list could be posted. It would represent co-ordinated knowledge of all the members of the association, and would be a factor for better business.

What has been done by various other national associations can unquestionably be accomplished by the National Assn. of Purchasing Agents, and it is this thought that spurred many of the Detroit purchasing agents to co-operate in the establishment of a branch of the national organization.

Organization Benefits

Co-operation in Buying
Direct Purchasing
Materials Standards
Master Catalog
Standardized Catalogs
Unfair List Posted
Bad Business Curbed
Legislation Improved
Higher Code of Ethics
Lower Operating Expense
Better Buying Methods
Closer Factory Relations

Woodruff to Be Chairman

At the meeting last night a temporary governing board was appointed, of which C. A. Woodruff, director of purchases of the Chalmers Motor Car Co., and a director of the National Assn. of Purchasing Agents, is chairman. The other members of the governing board are all purchasing agents of prominent local concerns. They are: J. H. Main, Cadillac Motor Car Co.; F. H. Maisonville, Timken-Detroit Axle Co.; H. H. Viot, Continental Motor Corp.; Geo. Berringer, Parke, Davis & Co., drug manufacturers; T. F. Thornton, Detroit Steel Products Co.; and H. Hawk of the Willys-Overland Co., Toledo, Ohio.

These are leading concerns, and the attendance list at the meeting last night showed that the representation was of the highest caliber. Two members of the national association, W. L. Chandler, who is back of the movement for the master catalog, and E. T. Wolfe of the South Bend branch, and a director in the national body, were present. They described the work of the national association and showed the importance of the work.

The germ of the Detroit branch was sown at a recent meeting called in this city by THE AUTOMOBILE, in which the purchasing agents stated their views on the factors governing conditions in the market situation. It was recognized that a local organization of the purchasing executives could not fail to be of value. Inquiry disclosed the fact that the national organization was eager to have a branch in this industrial center. Realizing the bigness of the work to be done, the financing and promotion of the preliminary organization have been carried on by the editorial office of THE AUTOMOBILE, and now that the organization is complete the branch has been turned over to the committee named above, which is composed of men familiar by years of experience with the problems in the buying field. It is expected that 250 to 300 local members will soon unite with the new organization.

In all probabilities the auditorium of the Detroit Board of Commerce can be secured for meetings. Last night's meeting was addressed by W. L. Chandler and E. T. Wolfe, of the national organization, and C. A. Woodruff, chairman-elect of the Detroit branch.

W. L. Chandler, Dodge Sales & Engineering Co., Mishawaka, Ind., dwelt on the fact that, while a large part of the purchasing agent's work must of necessity be independent, organization permits of concerted movements toward improvement of methods and conditions in this work and the elimination of illegitimate and otherwise undesirable factors. Mr. Dodge advocated bureaus for testing materials, securing information, etc., and mentioned the master catalog as soon to be a reality. His address, in part, follows:

Buyers en Masse

"Wolves hunt in packs; they do not roam by themselves in quest of their requirements. Great numbers operate as one organized unit in any enterprise affecting the common interest. They are said to be collectivistic.

"On the other hand, the cat is individualistic. Instead of hunting in groups of any sort, the cat hunts alone.

In fact, I know of no name such as pack, herd, covey or flock being applicable to cats.

"Now, a full-blooded, dyed-in-the-wool, born-for-the-job purchasing agent is necessarily of the individualistic type. He must think for himself and act independently of the rest according to his particular requirements.

"He may listen to the 'scientific salesman,' so-called, but must form his own opinion and sign on the dotted line only when his calm judgment tells him that the transaction is sound from his standpoint, regardless of the fact that every other buyer in his line may be represented as having bought the article in question.

"However, by insisting upon playing the game alone, he loses the great values that might be secured by co-operation. In order that he may reap the fullest harvest he should emulate the cat when such a course 'is indicated,' as the doctors express it, and then when he needs the tremendous power which comes with united effort he must follow the practice of the wolves and join the pack.

"In other words, he must emulate the Jekyll and Hyde plan, changing from one type to the other as occasion requires.

More to Business Than Selling

"During the last few years, big-business men have discovered that there is more to business than mere selling. Formerly the salesmen, through organized efforts, à la wolf, had convinced the general managers that every other problem of business was secondary to that of selling. There was enough sound logic behind their contentions to enable them to carry the pendulum much beyond the center.

"Many manufacturers are compelled through competition to sell their wares to the dealer and then perform the further function, with all its expense burden, of moving the goods off the dealer's shelves in order to get the big turn-over required to meet the sales quota and to increase consumption.

"In some cases the large turn-over thus obtained is justified in the light of lower proportionate overhead costs secured.

"However, much of the selling expense incurred today is a huge economic waste and is becoming such a burden that it must be recognized as such and proper remedies applied.

"During the last year about the only articles of value kicking around loose were orders. The only task for salesmen was to ascertain exactly what was wanted and to get the price high enough to cover the demands of the situation.

"The biggest problem of business to-day is to find material and men to produce the goods to fill orders. Two new sciences are being developed now as the pendulum begins its swing back toward normal. The sciences of buymanship and employmentship are receiving their proper consideration. A successful manufacturing enterprise depends upon:

Ample capital.

A product correctly planned.

A plant designed to manufacture it efficiently.

The right raw material at the right price.

Efficient labor.

Intelligent production methods.

Safe credits.

Adequate distribution.

Prompt collections.

"Some years ago the situation in the financial world led to the formation of the National Assn. of Credit Men. That association now numbers over 21,000 men representing practically as many concerns all over the United States.

Influence of Co-operation

"Prior to its formation, each credit man had been struggling and floundering, à la cat, wishing and hoping for more sane business methods pertaining to his work. They, like the buyers, were instinctively of the individualistic type—but they awoke to the fact that as individuals they could do little worth while toward improving the ethics of their profession; toward the curtailing of the abuses of credit granting and most important of all, toward eliminating dishonest practices in business transactions.

"They have demonstrated that thousands of credit men co-operating can exert a very beneficial influence upon financial legislation such as bulk sales laws, the federal reserve act, and many other matters which have been instrumental in greatly advancing the ethical phase of their work.

"They have reduced the cost of doing legitimate business by eliminating much illegitimate business.

"Buyers must continue to exercise the same individual good judgment in deciding when and where to buy, but collectively they will now be heard and felt in developing the science of buymanship.

"They will soon begin to reap those greater benefits that can only result from co-operation—from the force of thousands of buyers all seeking the elimination of the false in business as it affects their work.

Purchasing Agent an Executive

"The purchasing agent will take his proper place among the real executives of a corporation just as soon as he develops his capacities and renders a service worthy of his job. Unaided he cannot reach anything like the advancement which is possible when his efforts are multiplied by the thousands represented by the buying power of this nation.

"Buyers must develop a code of ethics—must eliminate crooked deals and questionable practices which operate against honest buymanship—must teach the strict observance of sales terms; the non-abuse of cash discount privileges; the conservation of the time of real salesmen; and discourage the unnecessary entertainment of buyers.

"In turn, they can include in the code of ethics a proper respect for the relation between promises and deliveries; discourage the use of order takers who cost their employers nearly as much for salaries and expenses as do real, sure-enough salesmen, and yet who are of no value to business; teach against the use of fraudulent and wasteful or non-productive advertising, and influence legislation against fraudulent sales methods.

"By co-operation, buyers may thus, like credit men, further reduce the cost of doing legitimate business by further eliminating illegitimate business.

"They may take a hand in framing standard forms of buying contracts, sometimes called sales contracts, bringing them, through co-operation

Why Organization?

An Example

¶ Unusual and interesting were many of the anecdotes related at the meeting. Following is one that well illustrates some of the troubles of the purchasing agent. It was told by F. H. Maisonville of the Timken-Detroit Axle Co.

"A few weeks ago a salesman called on me at our plant and sent in a card listing a number of companies and showing that he sold everything from fishhooks to ship anchors.

"'Are you in the market for malleables?' he asked.

"'Yes,' I replied. 'What firm do you represent?'

"'He scratched his head and answered, 'Well, I don't recall the name of the firm.'

"'Where are they located?' I asked, hoping to help him out.

"Again he scratched his head. 'I think they are somewhere in Wisconsin.'

"'Do they make railway malleables or motor car malleables? What kind of malleables do they make?' I asked.

"Exit salesman."

with selling interests, to a basis much more equitable than many in use to-day. The question of price control is another factor of business in which organized buyers may have a beneficial influence.

Testing Bureaus Encouraged

"Organized buyers may create or encourage bureaus for testing materials and bureaus of information from which may develop various standards for materials.

"For example: Consider the present standards used in the sale of lumber. These were established by salesmen. Will organized buyers suggest any changes in these standards? Coal has been sold without regard to the value to be derived by the consumer. Attempts are being made to buy coal on a basis of what is received for the money in the form of utilizable heat energy.

"However, coal operators frown upon anything which encroaches upon their sacred precinct. Big consumers of coal are the only ones able to make any headway against the opposition of the coal barons.

"Thousands of coal buyers, together with the coal salesmen, may agree upon an equitable basis of buying and selling coal so that each individual buyer may have the benefit of the strength of union.

"Other raw materials may be similarly influenced for good, and innumerable manufactured articles may be bought upon standardized specifications, provided there is some method of arriving at the proper specifications.

The Master Catalog

"Last, but not least, we are soon to have standardized catalogs. We all know the tremendous burden not only to buyers, but to business generally due to lack of uniformity in size, as well as arrangement in catalogs.

"Business men are everywhere striving to reach some standard for catalogs by which to eliminate much of the great waste of time and material now going on. Various organizations are struggling with the problem—each striving to solve the riddle from its own limited viewpoint.

"I am not wedded to any one form of catalog, but am convinced that commerce will never be fully served until all these various organizations which are struggling with this problem get together and lay their ideas and difficulties on the table where they may be studied by all and the best retained and adopted throughout the nation.

"My hope and belief is that when the smoke clears away each buyer will have but one catalog—his own—in which to find everything he buys.

Vertical Filing Cabinets

"I have previously suggested that vertical filing cabinets be utilized; also, that each industry, through its proper associations, prepare a portion of the index designed to enable buyers to intelligently file catalog data pertaining to that industry.

"Thus an index covering each commodity may be developed by those most familiar with its needs. The buyer, however, will use only such portions as bear upon his particular requirements.

"Divisions of the index may be numbered so that data bearing a proper number may be filed correctly by any average clerk. Arrangements can be made to guard against portions of such a catalog becoming obsolete by a method which has been explained in the trade press.

"Such a catalog may be limitless in size and scope. It may consist of any needed number of drawers. No restrictions need be placed upon quality of paper or printing except as dictated by the judgment of the seller.

"This catalog will have no influence on printed matter which now goes to the residences, or on matter not intended for preservation, and will not discourage a limited use of catalogs of styles such as are now in vogue where buyers or sellers desire to continue them for especial reasons.

"Such a file will accommodate anything from a letter to a bound book, provided it is not larger than the size of the file. Practical solutions of many other details have been evolved, but time and space will not permit elaboration sufficient to cover all.

"We have considered briefly many advantages that will follow the development of nation-wide co-operation of the buying fraternity. One buyer alone is powerless to do anything big, one local association can accomplish very little more. One State association can do a little better, but it seems very evident that we shall never derive our full share of benefits except through a national, or, better still, an international association.

"Shall we wait until the policies of this organization are formed and fully crystallized, or shall we join now while it is in a formative state, and help to shape its policies and to direct its energies into channels which will most promptly and effectively bring to us the fullest measure of benefits.

"Why not take our place in the sun now and have a worthy hand in the development of this most important association?"

National Body Organized

E. T. Wolfe, purchasing agent of the Baker-Vawter Co., Benton Harbor, Mich., and director of the National Purchasing Agents' Association, stated that the association was founded in New York 2 years ago, with the following as its purpose of organization:

1. To form the purchasing agents, or buyers, into an organized body for the common good.
2. To promote the friendly exchange of ideas and opinions.
3. To form local associations.
4. To familiarize the buyers with various products and sources.
5. To discuss and form routine purchasing methods.
6. To create specific standards for the buyer.
7. To gather data.
8. To diffuse information.
9. To obtain special speakers, that are experts in their lines, to address the members.
10. To establish various bureaus of information.
11. Support of domestic industries.

These principles are fundamental, and chosen to elevate the buying profession, which in the past has not been recognized in its true importance. Possibly the buyer has not been recognized because his work does not show a profit on the books, but chiefly because he has worked alone, and not organized with others in the same business.

The growth of the organization was shown to have been sound. In none of the local organizations were members solicited, and thus the members joining did so because they believed that the association could do them good, and were willing to work to make their beliefs come true.

By this means potential men were obtained as members, and Mr. Wolfe emphasized the necessity of obtaining influential men for the organization. And the growth in the past 2 years has been sound, and not a sporadic outbreak that will taper off to nothingness.

The qualifications for membership in the association are that the applicant be a bona fide purchasing agent—a buyer, and not a seller. Certain exceptions are permissible, such as executives, these exceptions being de-

cided by the local branch, who are best situated to decide upon the advisability of admitting the applicant.

Method of Finance

The initiation fee of $5 goes to the national association, and of the yearly dues of $10, $2.50 goes to the national association and the rest is kept by the branch. This is used for office expenses, entertainment and promotion work.

Though the convention is for the purchasing agents, the members were asked to invite the officials of their companies to the banquet, because by attending the officials will come to a better understanding of the benefits of the organization.

C. A. Woodruff, who was elected chairman of the temporary executive committee of the new organization, is well qualified to be chairman, having been a purchasing agent practically all his life. He was formerly with Armour & Co., Chicago, and then with the National Cash Register Co., as purchasing agent, before becoming associated with the Chalmers Motor Car Co., in a similar capacity. Mr. Woodruff is also director of the National Purchasing Agents' Assn.

Buyer and Seller Contrasted

Mr. Woodruff stated that the purchasing agent was of necessity the diametrical opposite of the salesman. He must of necessity be from Missouri, and of an analytical nature. Where the one is affable, enthusiastic, the other must consider and compare, neglecting if possible personality and favor.

Another condition that Woodruff suggested might be corrected was that of dealing through a third party. This condition has become more serious during the war. Material sells itself, yet many needless branch selling organizations are prevalent. And the buyer has to pay a fancy commission on a high-priced item that is purchased without sales effort on the part of the branch salesman.

For example, many standard articles may best be purchased direct from the factory. The buyer, needing these articles, will ask for quotations from the factory, and hears nothing until the local agent, who has done nothing to produce the interest, create desire, and close the sale, comes in and takes the order. For this he receives a commission varying from 5 to 25 per cent, that must be added to the price of an already high-priced item.

Standard Catalog Favored

Woodruff outlined the benefits of a uniform catalog system. If catalogs were printed on one side of a sheet, the sheet could be filed in a suitable filing cabinet, indexed, and kept up to date. As it is, he stated, it would take a search warrant to find the desired catalog, and another to find the item desired.

Relations between the purchasing agent and the rest of the organization could also be bettered. Many executives do not realize that a sales contract is a contract, and cannot be broken at will—engineers do not realize that standards adapted, but not followed, are useless, and that items not standard are costly and not easy to procure.

It was moved that THE AUTOMOBILE be given a vote of thanks for the work done in promoting and organizing the association. The vote was unanimous.

New Empire Four Improved in Appearance

Radiator Higher and Narrower, Windshield Slanting, Better Body Lines and New Top—Disk Clutch Replaces Cone

A NEW four-cylinder, five-passenger car, called model 50, has been brought out by the Empire Automobile Co., Indianapolis, to supplant its model 45. Because of improvements in body design and construction, refinements in the chassis and higher materials costs the price has been increased to $1,125, from $960, the price of the previous four-cylinder model 45.

The radiator of the new car is higher and narrower than that of its predecessor, presenting an increased cooling surface. The hood lines are higher and wider and the front cowl is raised, giving the car a smarter appearance. The windshield is now tilted, and the instrument board is of solid walnut. There are hand pads on all four doors. The center cowl is refined and there is a double-texture Neverleak cloth one-man top instead of the single-texture top used on the model 45. There is a new type of headlight.

In the chassis the Borg & Beck dry-disk clutch replaces the cone clutch formerly used. The new rear axle is of a different make, being semi-floating with a heavy yoke on the third member.

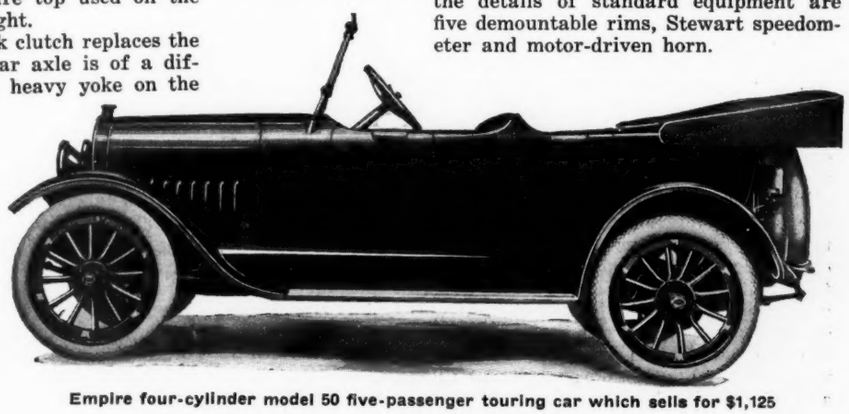
The Teetor-Hartley engine is continued with minor modifications. This is of T-head design, as previously, with a bore and stroke of 3⅞ by 5. It is said to deliver 40 hp. at 2000 r.p.m. Cylinders are block-cast with pistons of gray iron. The lubrication system is the Teetor patented splash type.

Ignition is furnished through a distributer from battery current and the switch is fitted with a key lock and the flow of current is automatically cut off when the engine is stopped.

A Stromberg carbureter is fastened to the cylinder block by means of a short spacer, the manifold chamber being within the cylinder block.

Two body finishes are optional on this touring car, a deep brown with brown Spanish leather upholstery and brown hood to match, or dark green with black long-grain leather upholstery. All fenders and running board splashers are black enameled.

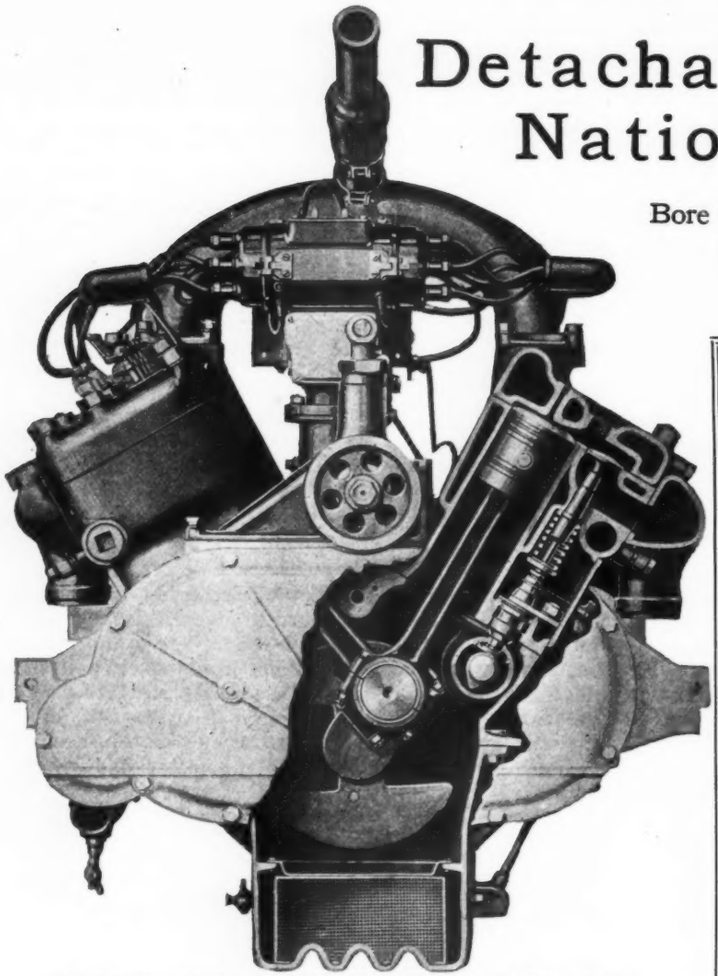
Starting and lighting are by the two-unit Empire Auto-Lite system, the storage battery being a three-cell, 6-volt, 80-amp. type. Tires are oversize, 33 by 4 in., with non-skid in the rear. Springs are of temperate steel and seat cushions are deep with the seat backs deeply tufted. The front cowl is deep and the doors have 20-in. clear openings. Among the details of standard equipment are five demountable rims, Stewart speedometer and motor-driven horn.



Empire four-cylinder model 50 five-passenger touring car which sells for $1,125

Detachable Heads for National Twelve

Bore Increased 1/8 In.—Crankshaft Counterweighted—New Intake System with "Hot Spot" for Vaporizing



Cross section of the new National twelve, showing the counterweighted crankshaft and the circular intake passage, which is kept hot owing to its proximity to the exhaust pockets

Twelve-Cylinder Series AK

Formula horsepower, 39.68.
Piston displacement, 370.1 cu. in.
Gear ratio, 4 7/12 to 1.
Ignition, Delco.
Carbureter, Rayfield.
L. and S., Bijur.
Transmission gear ratios:
- First speed, 2.77 to 1.
- Second speed, 1.66 to 1.
- Third speed, 1 to 1.
- Reverse, 3.6 to 1.

Turning radius, 19.5 ft.
Road clearance, 10 in.
Tires, 34 x 4½.
Twelve-cylinder, 4⅞ bore by 4¾ stroke.
Compression ratio, 20%.
Length of connecting rod, 10⅝ in. of drop forged steel.
Length of piston overall, 3 11/32 in. of cast iron.
Number of rings, 4.
Wristpin, tight in piston.
Upper connecting-rod bearing, 11/16 in. diameter by 1¼ in. long.
Lower connecting-rod bearing, 2 in. diameter by 2⅜ in. long.
Crankshaft, drop forged with 4 counterweights electrically welded.
Crankshaft bearings:
- Front bearing, 2¼ in. diameter by 3⅜ in. long.
- Center bearing, 2 3/16 in. diameter by 3¼ in. long.
- Main bearing, 2 3/16 in. diameter by 3 31/32 in. long.

Camshafts, forged with minimum diameter of 1⅛ in., driven by spiral gears cast iron, 1 in. face.
Camshaft bearings into bronze bushings pressed into case:
- Rear, length 2 7/16 in., diameter 2 in.
- Center, 2⅛ in., diameter 2 in.
- Front, 2⅜ in., diameter 2 in.

Valve timing:
- Exhaust open, 43½°; closed, 2° 40′.
- Inlet open, 6°; closed, 42°.
- Total opening period of exhaust valve, 226°.
- Total opening period of inlet valve, 216°.

Valve spring pressure, 52 lb. when valve is seated.

INTRODUCED for the first time early in 1915, the National twelve has undergone but little alteration in design. About 1000 of this type are in use at the present time. Now a new model is announced having all the principal features of the original twelve, but with a number of small alterations in the engine that give greatly increased power and, particularly, an even more noticeable high gear ability at low car speeds.

Taking the alterations briefly, they comprise an increase of bore from 2¾ in. to 2⅞ in., the stroke remaining 4¾ in. as before; a new intake system with a "hot spot"; a counterweighted crankshaft with larger bearings, and a detachable cylinder head. The oiling system is also improved and there are some other detail changes that will be mentioned in due course.

Not the least important of the changes is the use of the detachable head, because the even size of combustion chamber which this makes possible is of conspicuous advantage in obtaining perfectly regular running at idling speeds, where variations in the force of each explosion are most easily observed. This change in head design has not affected the layout of the engine in any way. The valves are still arranged L fashion and on the outside of the V, leaving the alley clear for the accommodation of the starting motor, the carbureter and the ignition unit. There are gear drives for the two camshafts and a silent chain for the ignition unit. The latter is new to the National, being now a double header Delco outfit; it is mounted at the front end of the cylinder alley and the shaft which operates it carries the fan pulley, this bringing the belt high up, where it is well protected from dirt and oil and therefore likely to have a maximum durability.

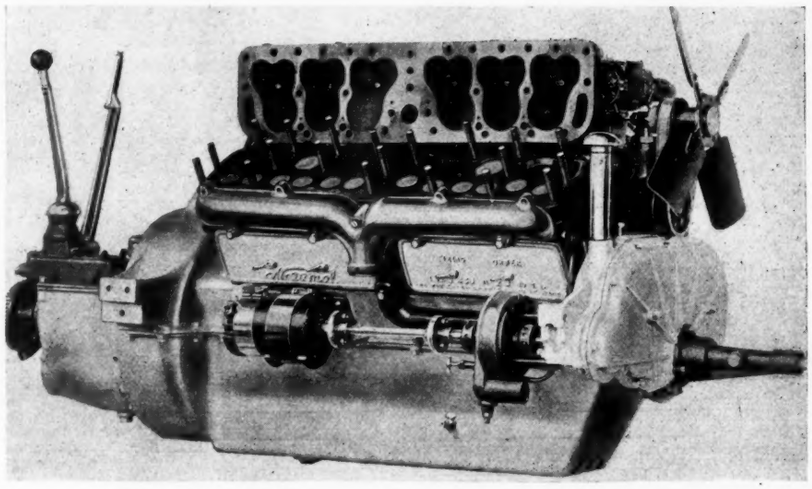
The new intake system, designed to allow the engine to handle heavy grades of gasoline with satisfaction, divides into two parts, or rather three. The manifold which connects the two blocks of cylinders is water jacketed, forming the water outlet from the cylinders. Its temperature is a fairly constant quantity, as the thermostat is located in the pipe leading up to the radiator. Next come the two cored passages within the cylinders, these consisting of a cross passage leading from the inside to the outside of each block and a longitudinal passage from end to end of each block.

The hot spot has been applied at the point where the cross passage intersects the lengthwise one. Referring to the cross sectional illustration of the engine, the circular passage seen beneath the valve pocket is the intake. It will be observed that the exhaust outlets, one of which appears in section in this view, are not separated from the intake by any water space, so they maintain a good temperature for the whole length of the passage. At the center, where the cross passage joins, a special exhaust pocket is cast *beneath* the intake as well as above it. It is at this point, where the direction of flow of the gas changes, that condensation is most likely to occur, and so this spot is kept hot enough to vaporize anything thrown down there.

In the same illustration the nature of the counterweighted crank is indicated, but this does not show that only four balance masses are employed. Experiments with both four and six masses showed that the four were more satisfactory.

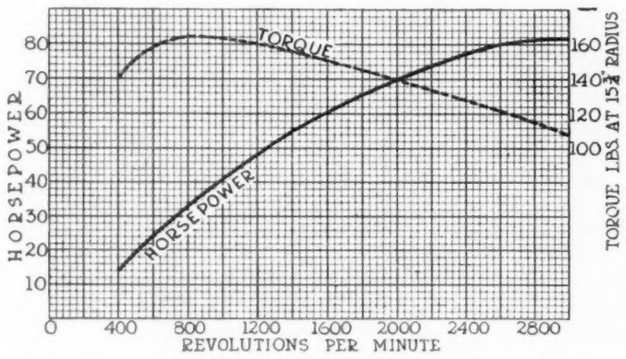
There are two at the center and one at each end of the shaft, the shaft being, for the purpose of balancing, considered as two three throw cranks, each half being put in balance by its own pair of counterweights. In obtaining the masses the rotating portions of the connecting rod assemblies were considered as well as the crank pins.

Throughout the crankshaft there is an oil passage from end to end, and oil is fed to each of the three main bearings. Should the feed to either two of these cease by any improbable accident, the remaining one is thus able to supply all the bearings, while with all three feeds in normal condition a more than ample supply is insured to every part. Pressure is controlled by the usual variety of release valve, which is set to give about 10 lb. per square inch at 20 m.p.h., rising to 30 lb. as the engine speed increases. There is also an additional, adjustable release valve for the separate oil lead that goes to the front end for lubricating the gears and the chain. There are also individual leads to the camshaft bearings.



Side view of the National twelve engine, showing the detachable head, a new feature this year

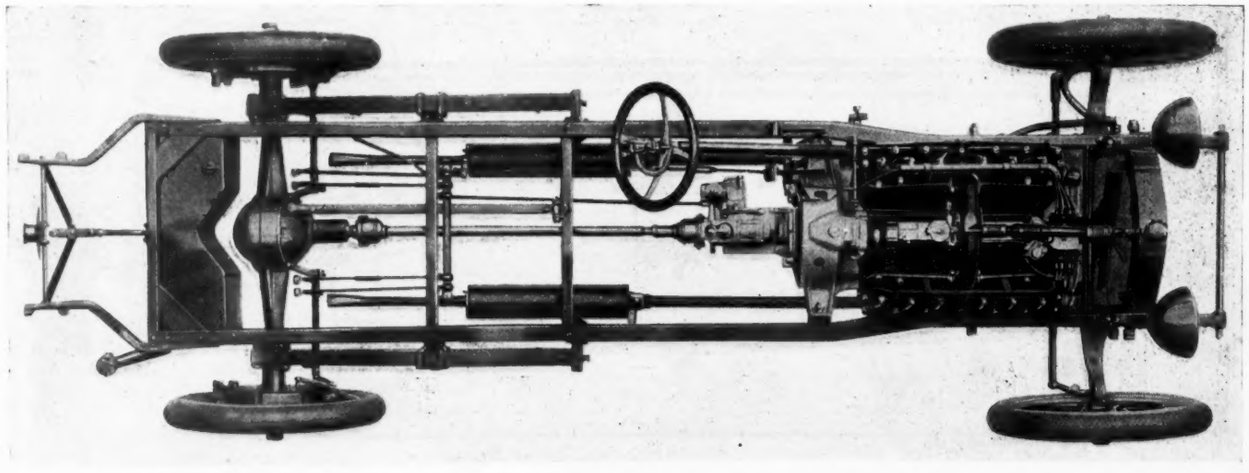
In laying out the new motor a good many experiments were made with valve timing and a very moderate setting finally adopted. The exhaust opens at 43½ deg. before bottom center and closes at just under 3 deg. past top center, while the intake opens 6 deg. past top and closes 42 deg. past bottom center. The lift is rapid, being from a mushroom tappet, and the power peak is around 3000 r.p.m., with a maximum torque at 800 r.p.m. At 800 the horse-power is 32 and the torque 215 lb. ft.; 14 hp. is obtained at 400 r.p.m., and the curve runs smoothly to the maximum of 81 hp. at around 2900 r.p.m., at which point the torque is still as high as 76 lb. ft. This means that the car has a wide speed range with especially favorable power to weight conditions from around 10 to 30 m.p.h., where the accelerative abilities are most noticeable. A maximum speed is not yet settled definitely, but it is nearer to 70 than to 60 m.p.h. with a full size touring body and may perhaps prove to be higher than 70. The standard gear ratio on high is 4 7/12 to 1.



Horsepower and torque curves of the National 2⅞ by 4¾ in. twelve-cylinder engine

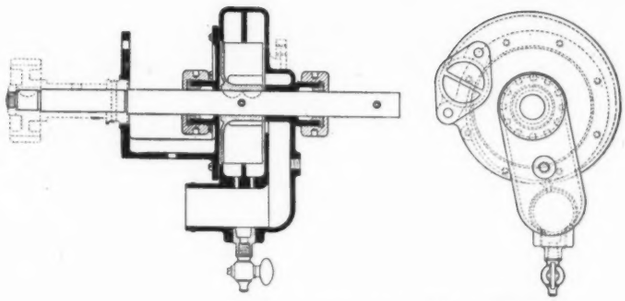
With the counterweighted crank the need for excessively light reciprocating parts is not pronounced, so cast iron is used for the pistons. The connecting-rod assembly comprises a forked and a plain rod, the cylinders thus being directly opposite each other and not staggered. Piston pins are tight in the pistons, which have four rings, three above and one below the pin.

For cooling the water pump is divided into two sections, though there is only one water intake and only one impeller. The pump casing is divided by a web running all around its circumference, and from each side of the case there is an outlet. The two outlets are brought together at a single flange, each here being of semicircular section, and a divided pipe carries the water to the middle of the right cylinder block. Here one-half discharges direct to that cylinder set, and the other passes through a passage in the cylinder foot, then through a short cross pipe and to the other cylinder block. The thermostat valve does not control a secondary circulation system. It is so set that it cannot close abso-

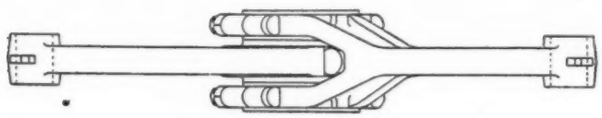


Chassis of the National Highway twelve, which has not undergone any change over last year's model. Note long, flat cantilever springs

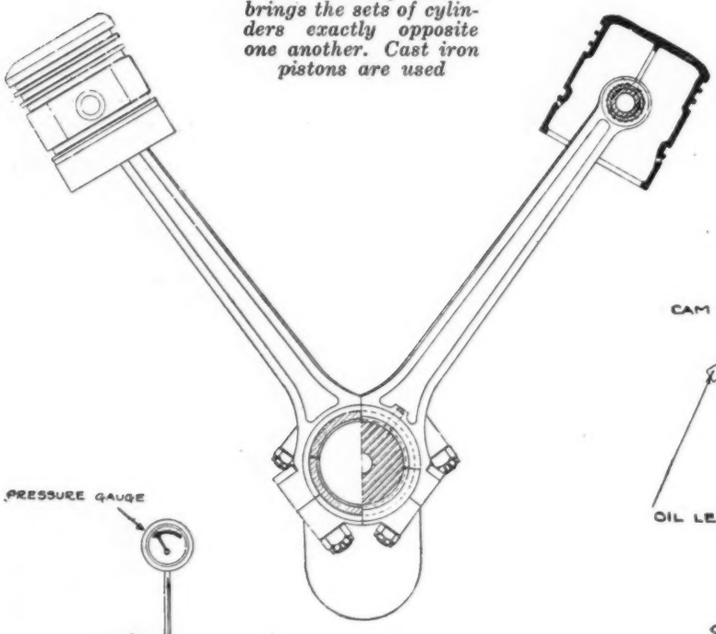
Details of National Twelve-Cylinder Engine

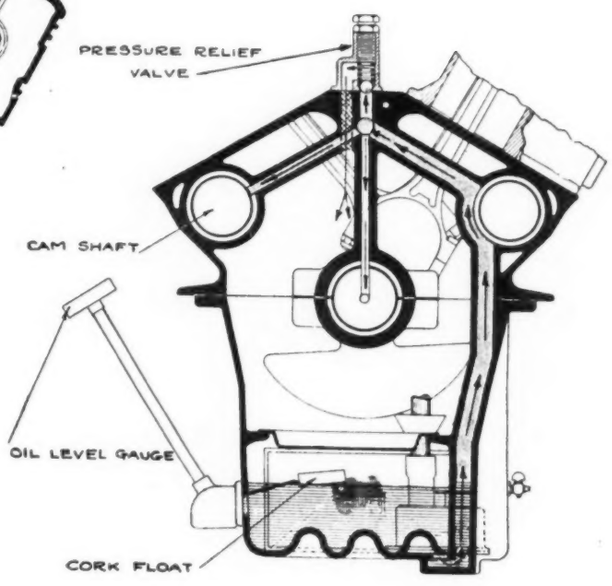


Water pump assembly. Note the dividing wall in the water space around the single impeller, thus forming a double pump



Fork-end connecting-rod assembly which brings the sets of cylinders exactly opposite one another. Cast iron pistons are used





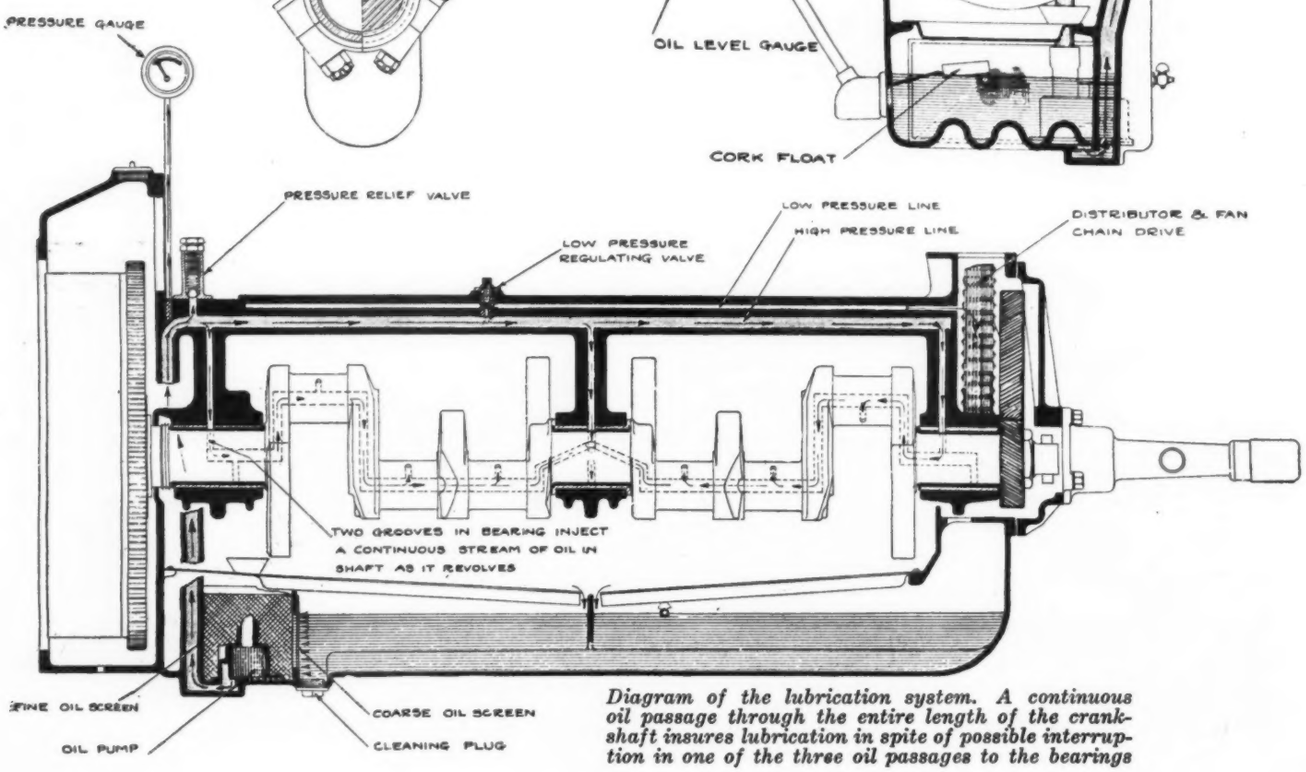
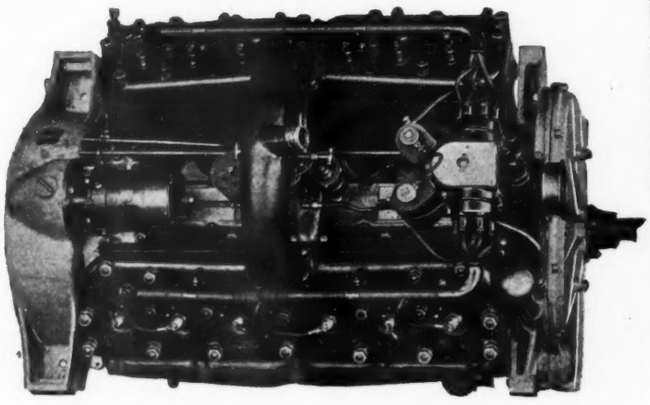
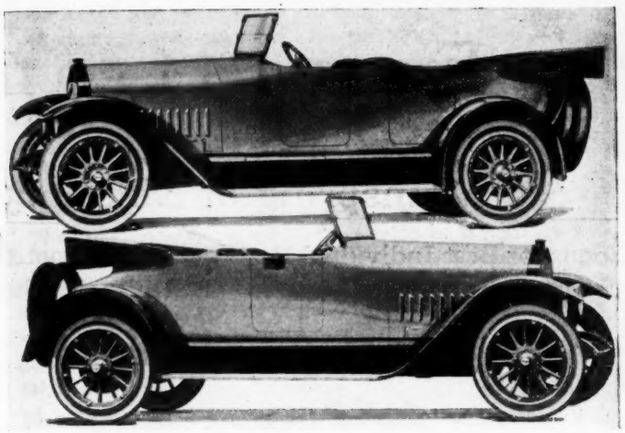

PRESSURE GAUGE
PRESSURE RELIEF VALVE
LOW PRESSURE REGULATING VALVE
LOW PRESSURE LINE
HIGH PRESSURE LINE
DISTRIBUTOR & FAN CHAIN DRIVE
TWO GROOVES IN BEARING INJECT A CONTINUOUS STREAM OF OIL IN SHAFT AS IT REVOLVES
FINE OIL SCREEN
OIL PUMP
COARSE OIL SCREEN
CLEANING PLUG

Diagram of the lubrication system. A continuous oil passage through the entire length of the crankshaft insures lubrication in spite of possible interruption in one of the three oil passages to the bearings



Location of the starting motor, carbureter and the double Delco ignition unit in the V passage of the National Twelve. The Delco igniter is a new feature this year



Above—National seven-passenger touring. Below—Four-passenger roadster. There is also a four-passenger sport phaeton

lutely, there being always a minute outlet to the radiator; this means that when the valve is closed the water pump operates against a strong resistance, and so there is a great deal of slip in the pump and very little water actually circulates. As the engine warms up the valve opens and allows an increased flow. This makes a very neat job of the thermostat and eliminates several pounds of metal that would be required for the piping of an alternative flow system, while it also is considered that the engine acquires the proper temperature more rapidly.

The chassis in which the new engine is fitted is identical with that of the previous model of Highway Twelve, the outstanding feature, perhaps, being the long and flat cantilever springs which National has now been using for nearly four years. There are three principal body styles, a seven-passenger touring car, a four-passenger sport type phaeton and a four-passenger roadster with clover leaf seating. The latter is proving a popular model and will constitute about two-fifths of the 1917 output. The four-passenger sport phaeton, which was shown at the winter exhibitions, has a single front seat with a very roomy cabinet back of it large enough to hold quite a considerable bulk of light luggage. The other two models, of course, have divided front seats, the roadster having only the front entrance doors. Two colors are optional, a rather delicate shade of pearl gray and a rich tint of blue, and all three models sell for $2,250 with complete equipment. Tires are 34 by 4½ in., and provision is made for two spares at the rear end of the frame. Special types and closed bodies are, of course, also obtainable.

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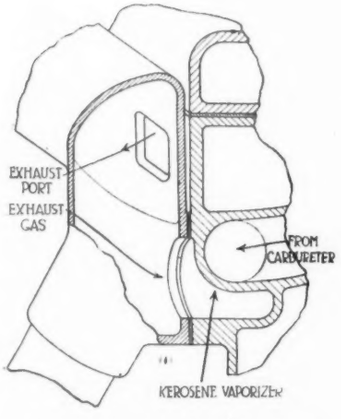
Export Trade Directory Is Ready

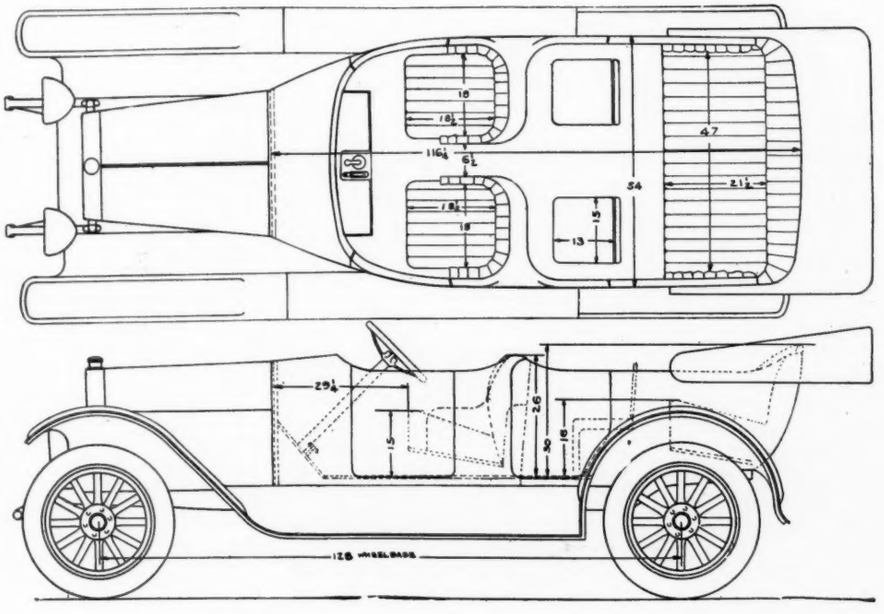
A TOTAL of 1295 New York export houses are listed in the new edition of the *American Exporter's* Export Trade Directory, as compared with 785 in the previous edition. The new book comprises 536 pages as compared with 369 in the last edition, all departments being enlarged. In addition to the New York list there are 117 exporters in San Francisco as compared with ninety-seven previously and other lists covering Boston, Philadelphia, Chicago, New Orleans, Portland, Ore., Seattle, Tacoma and other cities, making a total of 1562 American export merchants or commission houses. Foreign exchange banking houses, marine insurance companies, steamship lines, combination export agents and other lists are features.

Classified index departments have been greatly expanded, now covering thirty-seven pages. In the divisions devoted to automobiles and accessories there are ninety-one concerns listed, eighty-two of which are in New York, two in Boston, two in Philadelphia, one in New Orleans, and four in San Francisco.

The book sells for $5 and may be purchased through *The American Exporter*, 17 Battery Place, New York.



Above—Detail showing how the intake passage is heated by the exhaust gases at the center of each cylinder casting, forming a vaporizer



Right—Side elevation and plan of the seven-passenger National twelve

Emulation

The

Mainspring of Efficiency

Bonus for Best Individual Records and Competition Between Departments Two Features of Miller Rubber Co. Plan

By Allen Sinsheimer

¶ *EDITOR'S NOTE—This is the sixth of a series of articles based on an intimate study of the work being carried on by our large automobile, motor truck, tire and accessory makers to improve industrial relations. Better home and working conditions are two features that are emphasized. The promotion of health by the B. F. Goodrich Co., the Goodyear Tire & Rubber Co.'s solutions of housing and other problems for its workers, the system for reducing labor turnover by the Firestone Tire & Rubber Co., Cadillac benefits and the Reo clubhouse were features of previous issues.*

THE difference between a football team and a section gang is the difference between eager animation and reluctant drudgery. On one hand is activity, vim, energy, dash and snap. On the other is dullness, dawdling, indolence and procrastination. The football team works at its play; the section gang plays at its work. It is a situation common to all industry. Men, everywhere, throw more power and thought into their games than into their labor. They lack the enthusiasm for the work that exists with the play—the work lacks the something that makes the enthusiasm. And the Miller Rubber Co., at Akron, viewing these conditions with a human and humane regard, has inculcated its men with a spirit that sprouts an unusual success. It has tilled its soil of labor, sowed the seed of emulation and cultivated an efficiency in its shops that combines all the zest, eagerness and energy of healthy play. It has grafted a co-operative competition to its factory labor and reaped a remarkable crop of high quality and huge quantity of product.

From the beginning the company endeavored to produce the highest quality of product. It sought to build up a perfect chemical department, and, starting with one chemist and a small laboratory, improved it until now there are twenty-four chemists working in a laboratory equipped with every device that makes for efficiency.

Building Upon Human Nature

In the same way it bettered its mechanical equipment, adding new machinery and removing obsolete tools as rapidly as possible. When the laboratory and the factory seemed as perfect as mind and money could make them, the officials of the company, and particularly W. F. Pfeiffer, secretary and general manager, felt that Miller products should attain a very high standard. But they discovered that an important element had been neglected; that, in fact, the most important factor—the human factor—had been overlooked, and with this in mind the company introduced a bonus plan, based on common sense and a keen knowledge of human nature, that has been exceptionally productive of beneficial results.

Experimenting, at first, with a few employees, an official explained carefully that a prize would be granted the worker who at the expiration of 30 days attained the highest record for efficiency. A series of percentages was arranged to determine the records and the men were penalized a specified number of points. Thus they were started with 100 per cent and then suffered a deduction for each time they were late, absent, made a blemished article or produced less than the average standard of quantity. The man with the highest record for the first month was given a silk shirt. Since the experiment, the prizes have comprised financial rewards given as follows:

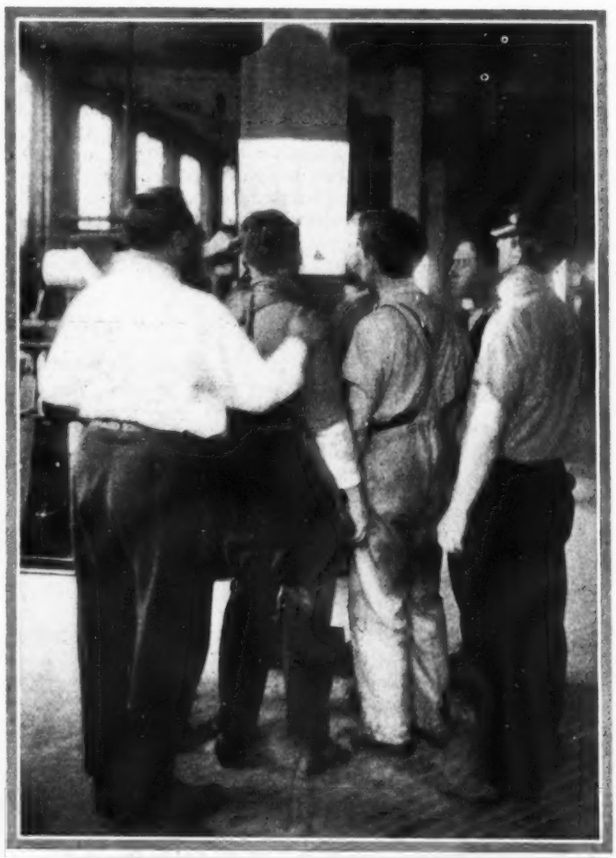
100 per cent record	$10.00
95 per cent record	7.50
90 per cent record	5.00

The records made by the various individuals in each department and the total average department records are posted regularly each month on specially constructed bulletin boards. The prizes are given only to the individuals, the department records being posted to stimulate departmental pride and thus to produce better averages through rivalry.

Friendly Rivalry Created

The interest displayed by the workers is remarkable. They crowd about the bulletin boards, which they call scoreboards, and pass such remarks as "Let's see my batting average," and "I'll get you next month." And since the department averages have been posted a friendly rivalry has been created between the departments which promises to further add to the value of the plan. In fact, the workers themselves have been overheard to take to task those employees who, because of excess drinking or other faults, have caused a reduction in the monthly percentage.

In addition to the bonus, the company discovered another method for improving work. It found that shorter working days do not mean shorter production records, and that instead they result in the expenditure of a concentrated energy that



Miller Rubber Co. employees jealously watch the bulletins of individual and department efficiency ratings which are posted each month, and a keen, friendly rivalry exists

increases the production. Mr. Pfeiffer, making a study of factory conditions from the lost time and lost effort viewpoint, experimented with a few workers who displayed a tendency to slacken their efforts at certain periods each day. He allowed them to start work at 9:15 each morning, 1 hr. later than the others. The results proved so successful that the 8-hr. day was instituted throughout the plant. Just what this move and the bonus plan have wrought is shown in the following table:

FEMALE LABOR

Girls working at piece rates were found after 6 months to have increased:

Earnings from 16.4 *cents per hour to* 21½ *cents per hour.*
Production from 82 *per cent to* 107 *per cent.*
Attendance by 10 *per cent.*

And in another department increased:

Earnings from 16.4 *cents per hour to* 21½ *cents per hour.*
Production from 75 *per cent to* 97½ *per cent.*
Attendance by 6½ *per cent.*

MALE LABOR

Men working at piece work rates were found after 1 year of the new plan to have increased:

Earnings from 31½ *cents per hour to* 51 *cents per hour.*
Production from 69½ *per cent to* 113½ *per cent.*
Attendance from 86.4 *per cent to* 91 *per cent.*
Workmanship from 87 *per cent to* 97 *per cent.*

And in another department increased:

Earnings from 48½ *cents per hour to* 61½ *cents per hour.*
Production from 88½ *per cent to* 121 *per cent.*
Attendance from 39.3 *per cent to* 94.2 *per cent.*
Workmanship from 99 *per cent to* 99.9 *per cent.*

Thus the change of schedule from the 9-hr. day to the 8-hr. day, while effecting no increased cost to the company, since the same piece-work rates were maintained, resulted in a vast increase of earnings to the workers while it augmented production to a marked degree.

Improving the Work

The Miller Rubber Co. adopts the humane attitude toward its workers in every instance. When an employee signifies his desire to quit his work, the company takes the view that "there is something wrong with the job, not with the worker." And it has established a bureau where men who leave are interviewed and an effort is made to determine why the work is unpleasant and if it cannot be improved.

Sheldon Relief Assn. Work Gains in 1916

THE Relief Assn. of the Sheldon Axle and Spring Co., Wilkes-Barre, Pa., was organized in 1907 and since that time it has collected $23,977.60, including dues, receipts from its annual picnic, interest on investments and interest on money in bank. During this time it has paid out $15,854.92, leaving its net worth at $8,122.68 of which it has $6,000 invested in securities, giving it an income of $360 per year.

During the past year $1,554 has been paid out for sick benefits, and death benefits have totaled $690. The by-laws of the association call for a reduction in the dues to one-half, when it has $5,000 or more in the treasury. During the past year, on the 25 cents per month basis for members who have been in the association for 1 year, it has taken in enough money to pay its expenses and still be ahead with a gain of $622.68 as against $500 the former year.

The membership at present consists of 680. The dues are 50 cents the first year and 25 cents per month thereafter. A member is elegible for benefits within 90 days from the date of his application.

Sick benefits are $6 per week for 12 weeks and $3 per week for the following 8 weeks, making a total of $96 for the calendar year.

Annual meeting of the Relief Assn. of the Sheldon Axle and Spring Co. held March 24. About 1700 Sheldon employees attended

Java

A Growing Market

100,000 of 42,000,000 Population Are Potential Car and Truck Buyers To-Day —6000 Cars in Use — Good Field for Trucks in Sugar and Coffee Industries

By P. Vandermark

JAVA, in the Far East, is not looked upon by many automobile manufacturers as a great selling center for automobiles, motor trucks or farm tractors. It is generally considered a small island with a relatively small population. It is necessary to revise our impression of the island, which is approximately 600 miles in length and ranges up to 150 miles in width. This means an island as long as from New York City to Cleveland as the crow flies. The population of this island is 42,000,000; in other words, Java has almost as many inhabitants as Australia, the Dominion of Canada, the Argentine Republic and Brazil combined. From an automobile point of view this population is not very potential, in that only a small percentage of it can be considered in the market for automobiles. Notwithstanding this, American cars have been selling very satisfactorily in Java for the last 2½ years. Previous to that time the high-priced European machines were being sold, so that to-day in Java you see many such European machines as Fiat, Renault, Panhard, Benz, Daimler, Charron, Delaunay-Belleville, and other well-known European makes. In 1 year the Fiat dealer placed 300 of his cars in the island.

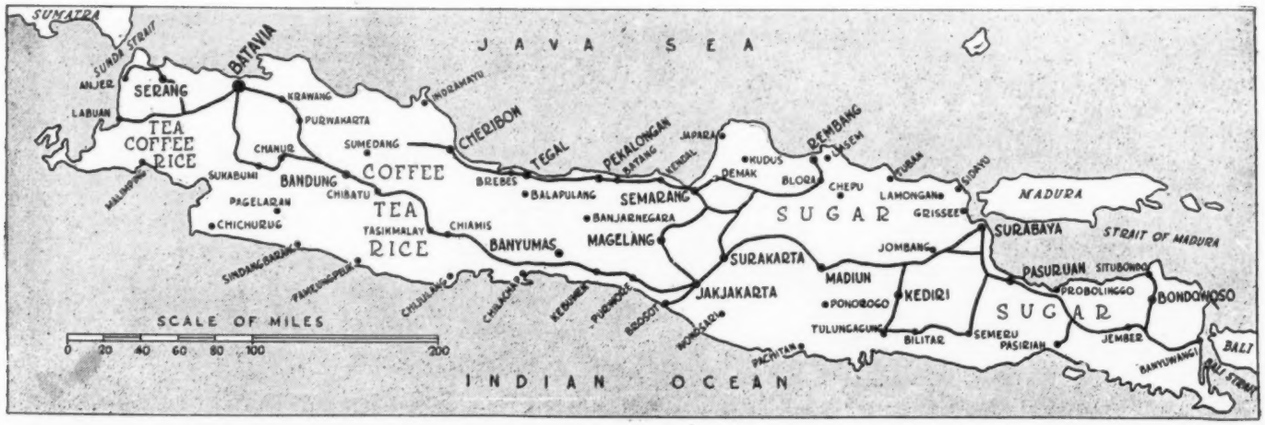
With its population of 42,000,000 Java has only a potential buying population at present of perhaps 75,000 people. This figure might be placed at 100,000. As years go on the car-buying population of the island will increase, largely because each year finds a wider sale for our low-priced cars which are now becoming well established on the island.

Looking at the present 75,000 possible buyers we might analyze them as follows:

P. VANDERMARK

Far East representative of the J. B. Crockett Co., automobile exporters, New York City. Mr. Vandermark has spent 6 years in Java and the Straits Settlements in the automobile industry, having started as a garage manager in Singapore 6 years ago. He has been with the J. B. Crockett Co. for 2½ years. He introduced several well known U. S. A. cars in the Far East, including Hupmobile, Saxon, Empire and Maxwell

There are 40,000 Europeans located in the cities and as planters throughout the country. This population perhaps represents 15,000 European families, as many Europeans are bachelors, and the potential car-buying population is correspondingly increased. Next come 20,000 Chinese, who are largely engaged in trade lines, and many of whom are good machinists. The Chinese have been good car buyers, beginning in the days when the high-priced European car was the big seller. Third in this group of 75,000 potential buyers come the Arabs, who are good merchants, but not of such a high standard as the Chinese. Approximately 95 per cent of all Chinese and Arabs using automobiles in Java employ chauffeurs. Both of these classes are just as good buyers of the high-priced European car and often better than many of the European population. It is to these three classes at the present time that American automobile manufacturers



Map of Java, showing the roads which follow the railroad lines practically throughout the island. The staple products of the various districts, which are chiefly rice, sugar, coffee and tea, are indicated. The crops during the last 2 or 3 years have been very good and prices higher

must sell practically all of their product shipped to Java.

Unquestionably as time passes the market will expand, but there do not seem to be bright prospects for it at present. This brings us to a consideration of what might be called the native Java population, or the Javanese, as they are designated. The Javanese are not property owners; they do not own the sugar, coffee, tea, rice, rubber, and spice plantations of the country. They are workmen. They perform the manual labor on the plantations, which are largely owned by Europeans, the Dutch being leaders in this field. It can be said of the native Javanese that he is a laboring gentleman. In color he is not so dark as the American negro, and quite different in characteristics. He is fond of dress, is not especially fond of work, but essentially a gentleman in his own sphere. At present the native Javanese, constituting more than 99 per cent of the population, is not interested in automobiles. It is questionable if he has ever expected to own one. In fact, he gives no indication of possessing an ambition to own one.

A very old stone road in middle Java, with rice terrace on the hillside. This is a Charron car taken 3 years ago

Naturally in a population of 42,000,000 there is a big percentage of the native population engaged in other pursuits than working on plantations. Many are in mercantile lines; but even here the status of their business is not such as to warrant their purchasing cars.

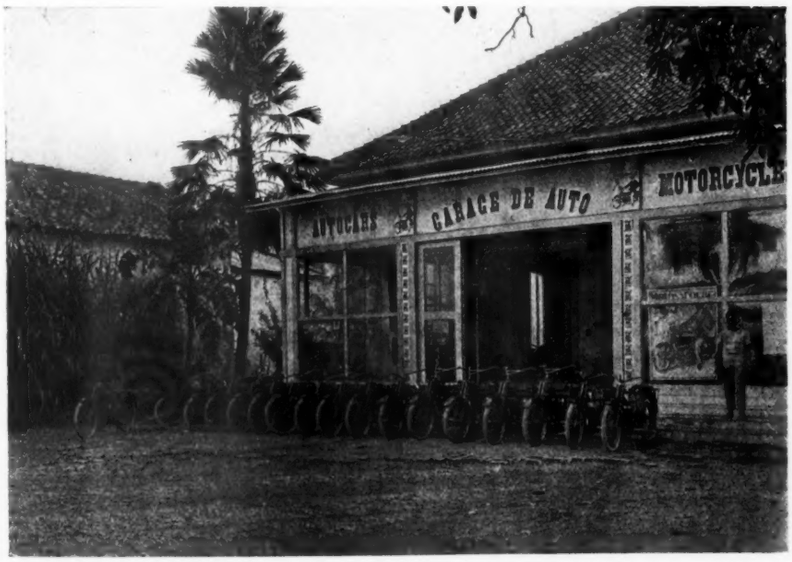
60 Per Cent of Automobiles Made in U. S. A.

The car population of the island of Java at present can be conservatively placed at 6000 machines, of which 60 to 70 per cent are of U. S. A. manufacture. Three years ago there were very few of our machines there. As late as 1913 Fiats to the number of 400 were sold on the island. Italy and France had the greater part of the business until the end of 1913.

It was in 1913 that the U. S. A. got into the Java market, there not being 100 American cars sold a year previous to that time. The following season, 1914, was the real start of American cars on the island, largely due to the fact that the beginning of the war in that year cut off all European shipments, with the possible exception of Italy. Since then our cars have been selling in large quantities.

A very satisfactory feature of our car sales in Java is that the European population, as well as the Chinese and Arab, is now convinced that the American high-priced car is just as good value as the high-priced European car. When we started introducing our low-priced cars there was no competition from Europe because it was possible to sell our machines at so much lower price. It was not so with our higher priced machines. Fortunately this was changed, and now our high-priced machines are considered as good value as European ones.

At this point it may be well to give a passing picture of the island of Java as affording a possible field for the wider use of automobiles. The island, 600 by 150 miles, is a little larger than England, Ireland, Scotland and Wales combined.



Garage in Batavia, second largest city in Java, taken 2 years ago. Just an average garage; sells seventy cars and 100 motorcycles per year

The island is generally hilly, with the exception of the east end, which is low and largely used for sugar cultivation. There are good roads over the entire island. The construction of these roads was started over 100 years ago at the instigation of Napoleon. Java is a Dutch possession, and when Napoleon temporarily got control of Holland, naturally Java fell under his sway. With true Napoleonic judgment he at once began the building of roads, with the result that Java has many miles of good roads well suited for automobile use. A casual reference to the map of the island accompanying this article will show that you can drive from the city of Batavia up the west end and all along the north shore practically to the opposite end. In addition there are good roads leading down to the southern coast and a great many cross-roads

Typical Javanese road, showing native huts in Western Java near Bandoeng (Bong-Dong), the big tea country; 3000-ft. altitude

zigzagging between the towns along the north coast to towns and cities in the center and on the south coast.

There is generally good automobiling in the cities. Batavia has many miles of good streets, and also many miles of poor streets. They are, as a rule, wide enough for car use, the same as in any American city.

In addition to what might be described as a very good system of highways the island is well supplied with railroads, as the map shows. The railroad system starts at Batavia and connects up with such cities as Bandoeng, Tegal, Joklakarta, Semarang and Surabaya. There are other short feeding railroad lines, and in the sugar country at the east end are many small railroad lines serving the plantations.

Java's Principal Industries

A panorama of the industries shows that tea, coffee and rice are largely grown in what is known as the west end of the island. This is quite high, and all three crops thrive well on high ground. The center of the island continues fairly high, and is mostly used for coffee, tea and rice. As previously stated, the eastern end is low and is used for sugar cultivation. Java has long been historic for its active volcanoes, and at present several of them are active. These are smoldering, emitting smoke most of the time, but there have not been any serious eruptions for some years.

Returning to the motor industry of the island. The selling of motor cars is largely controlled by the Dutch, the majority of whom speak English, and are often complimented when correspondence with them is carried on in English. No natives are in the automobile selling or garage field at present. There are few foreign firms in the dealer field outside of the Dutch. Previous to the war Germany was establishing herself quite strongly, but that has entirely vanished in the last three years.

Selling Methods

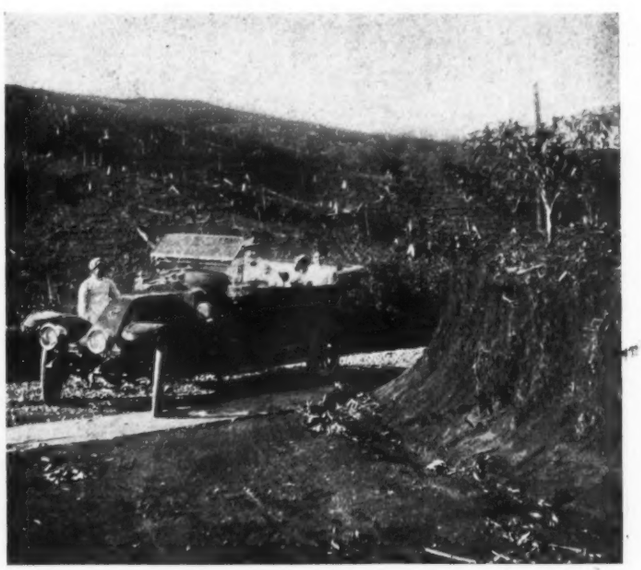
Selling of automobiles in Java may be handled in different ways: Some firms place the entire distribution for the island in the hands of one dealer, who may be located in any of the ports—Batavia, Tegal, Semarang or Surabaya. Other concerns divide the country up and sell direct to dealers in each of these cities, thereby treating the island as four separate divisions. Naturally giving the agencies to four different concerns should result in more intensive sales, but also calls for closer watchfulness on the business. In none of these cities is there a motor or automobile row such as exists in our smaller American cities. Notwithstanding this, the dealers are generally financially strong. They advertise in the local papers, have showrooms in which cars are displayed, but rarely employ salesmen who canvass the business men in their offices as we do in this country.

Practically all businesses other than the automobile business are carried on on a credit system, extending over 60, 90 and 120 days. In the retail field cash is generally demanded on small purchases, but on larger transactions credit has invariably to be given.

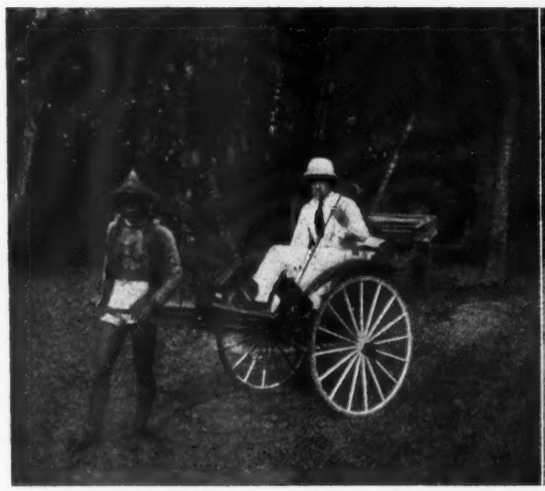
American Car Created New Buyers

To understand how U. S. A. automobiles were received in Java we should bear in mind that a 20-hp. European car sold at $3,200 U. S. A. gold, and our American cars started selling at $1,400 U. S. A. gold. This immediately created an entirely new class of buyers, as there were many Europeans in business in Java who could afford to spend $1,400 for an automobile but could not think of spending $3,200. If they did not have the $1,400 ready for an American car they would pay half and borrow the remainder. Previously they could not think of doing this with European cars because of the higher price. Owing to this, the car-selling field in Java was enormously broadened as compared with the field existing when European cars were sold.

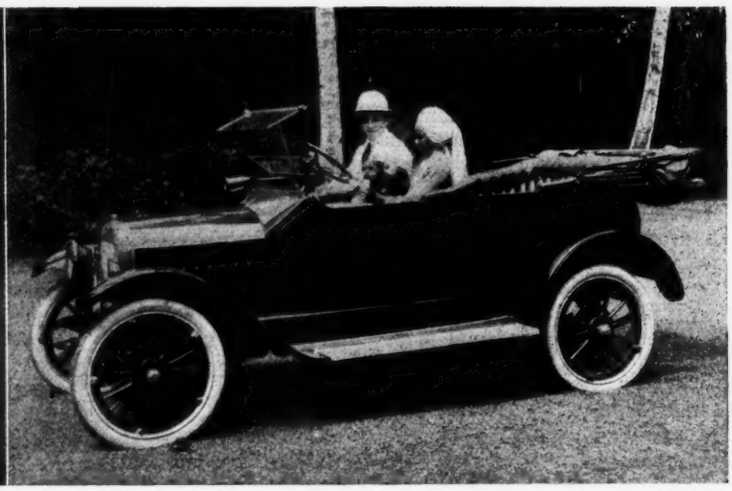
U. S. A. cars sell much higher in Java than they do in this country. It costs approximately 45 per cent of what a dealer pays a U. S. A. factory for the car to get it on a salesroom floor in Java. For example, if a Java dealer purchases a car in Detroit or Toledo for $500, it costs him approximately $866 by the time he gets it on the salesroom floor. In other words, $366 has been spent



Newly made road in Western Java near Bandoeng. The soil is black, country rolling and the trees cleared off to the ground



One of the 18,000 rickshaws used in Singapore. The author enjoys this taxi at 4 cents (U. S. A. money) per mile at 5 or 6 m.p.h. Java has no rickshaws, as the Chinese will not use them



P. Vandermark in Singapore, with native assistant, who cranks the car and polishes it for $4 a month in Straits money. As the Straits dollar equals 56 cents in U. S. A. money, the assistant's wages in our currency amount to about $2 a month

in getting the car from the factory to the consumer. Here is an example of how this cost is made up:

Original cost of car, U. S. A.	$500
Crating at factory	25
Freight, U. S. A., factory to seaport	26
Ocean freight	210
Insurance	10
Import duty	75
Landing charges at Java port	20
	$866

Should the dealer in Java not be located at a seaport it will cost him $16 to deliver the car overland to his place of business. To these expenses 3 per cent war risk insurance must be added at the present time.

American Car Admirably Suited for Java Roads

Owing to the fact that Java has relatively good roads, practically the same car that is sold in America serves admirably for Java, except that the steering wheel should be on the right-hand side, as the rules of the road are opposite to those in America. In all other respects our standard U. S. A. car is satisfactory. The 56-in. tread is all right, and any clearance will suffice. Speedometers must read in kilometers; metric sizes in tires are wanted; clincher types are in general use, and the high-tension magneto is in demand. There is strong opposition in Java to battery ignition and the storage battery in general. The trouble is that the Javanese chauffeur is totally ignorant of the battery. It is a mystery to him. He uses the same term when speaking of a battery as he does when speaking of medicine. This explains how almost hopeless it is to get that attention for the battery which it requires in such a hot country. The humidity of the climate is hard on the battery, and this, together with the high temperatures, makes the life of a battery scarcely 50 per cent of what it is in the U. S. A.

The selling of U. S. A. cars with electric starting and lighting is accustoming the Javanese chauffeur to electricity; but what is needed in Java as well as in many other sections is good information and explicit instructions on the care of the storage battery.

There are a few other details with regard to automobiles for the Java market that should be kept in mind. To date there has been little market for closed types such as limousines, coupés and permanent sedans. It is possible that a good market will soon develop for detachable top sedans, or what we know as the winter type of body.

Runabouts are not popular, as the owner objects to sitting as close to the chauffeur as he has to. The cloverleaf type should be popular. Wire wheels are in demand.

Various colors are popular in Java, some of the leaders being maroon, French gray and khaki. There is a strong demand for upholstery and slip covers to match the car color. Slip covers are manufactured locally.

The question of spare parts is as vital to automobile dealers in Java as in any other country far removed from the factory. Should the part of a car made in the U. S. A. and owned in Java break it would require 2 months to get the spare. No car owner in Java enjoys the prospect of having his car laid up for that length of time. Dealers in Java are willing to stock up liberally with spare parts in proportion as they sell cars. It would help American business very materially if the factories would co-operate in the carrying of stocks of spare parts. No better impetus could be asked for than this co-operation. In case the factory cannot financially co-operate it should give careful attention to shipping only those spares which are most needed. The part of a car that gives trouble in the Dakotas will, in ninety-nine cases out of a hundred, give trouble in Java, so that the U. S. A. maker is in a good position to know what spares should be carried in Java and other eastern points.

Car Dealers and Garagemen Handle Accessories

In Java the accessory trade is handled exclusively by car dealers and garagemen. In the city of Batavia there are thirty garages, practically all of which sell accessories. In the city of Tegal there are seven. The Dutch are good mechanics, and all over the island can be found good public garages. The sale of U. S. A. accessories must follow in all countries the sale of U. S. A. cars. You cannot continue to keep our cars running without the accessories. The majority of accessories that sell at home will sell in Java.

At present gasoline is selling in Java at 48 cents per imperial gallon, which means about 42 cents per U. S. A. gallon. It is sold entirely in 4-gal. cans, the cans being crated in pairs. Gasoline pump systems at garages are not in use.

In Java, because the country is located within the tropics, the selling season is not as clearly defined as in America. As in most tropical countries, there are two seasons—the dry season and the rainy season. The dry season extends from November to May and the wet sea-

son from May to November. In the wet season it rains every day, but generally in the forenoons. This makes possible the general use of cars throughout the year.

The car-selling season in Java is not dictated entirely by the wet and dry season, but rather by the period at which the different crops are harvested. Sugar being the biggest crop, and being harvested in November and December, these 2 months become the greatest selling months. The other crops, such as tea, coffee and rice, are harvested all year round. Many of the Europeans, Chinese and Arabs buying automobiles make loans on their crops, so that the sale of machines coincides very closely with crop conditions. For 2 or 3 years crop conditions have been very good and prices high, which has greatly favored the sale of U. S. A. cars.

Suggestions for Our Makers

Many complaints come from Java with regard to the methods employed by our factories in handling the trade there. Generally these are not serious, but they suggest lines of improvement for our makers handling foreign trade. Here are a few of the points on which criticism is most generally heard:

1. Too often inferior wood is used in the crates so that they break before reaching their destination. Whenever the material in a crate breaks some part of the car is injured.

2. Very frequently not enough waxed paper is used in arranging the cars for shipment. Water reaches the upholstery, the top or some other parts.

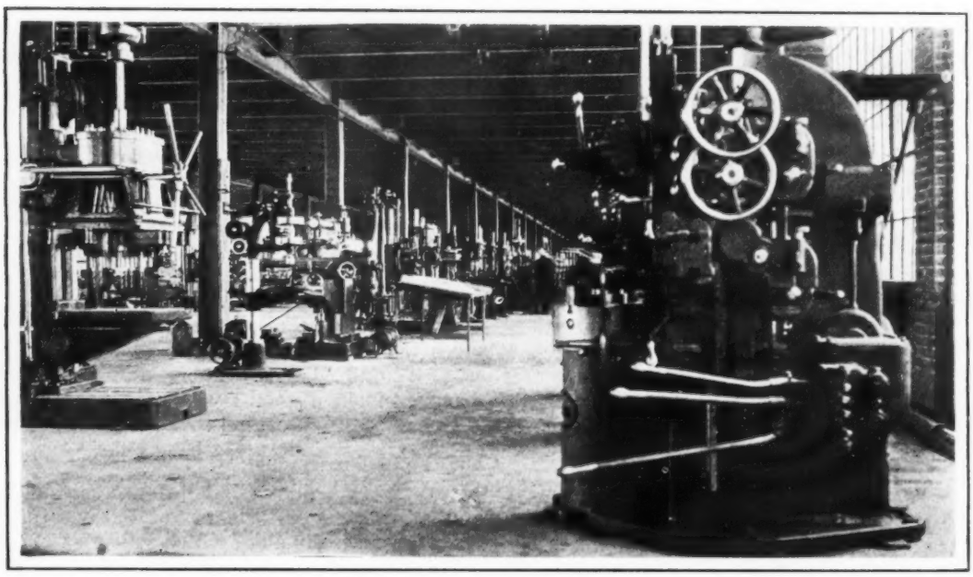
3. If the nickel parts are not heavily greased they invariably arrive in bad condition.

4. Each car should be accompanied by an instruction book in English and a catalog in the same language.

5. Too often our manufacturers cause dealers heavy expenses in cabling. The cable rate from Java to America is $1.35 per word. The deferred rate is one-half this charge. Cabling should generally be handled on deferred rates.

While the possibility of selling motor trucks in Java has not been developed, their exists a good field. It will have to be developed and will require considerable time. The sugar industry offers the greatest opportunity. The average haul is 3 to 4 miles. Roads are reasonably good and motor trucks would serve. At present in the large plantations there are narrow-gage railroad lines running through the plantations. The position of these lines is changed from time to time. This is costly. With the motor truck and the greater flexibility it affords cheaper transportation of the cane from the plantation to the mill and of the sugar from the mill to the railroad or port will be possible.

In the coffee country, which is a rolling territory with good roads, the average haul is 3 to 4 miles. As in Brazil, where the truck is being used in the coffee industry, so in Java there is opportunity for its use. Tea is cultivated in the highlands, and the field of truck possibilities is more limited. Rice is cultivated on the hillsides as well as on low grounds, and hence the use of trucks in rice culture is not a factor.



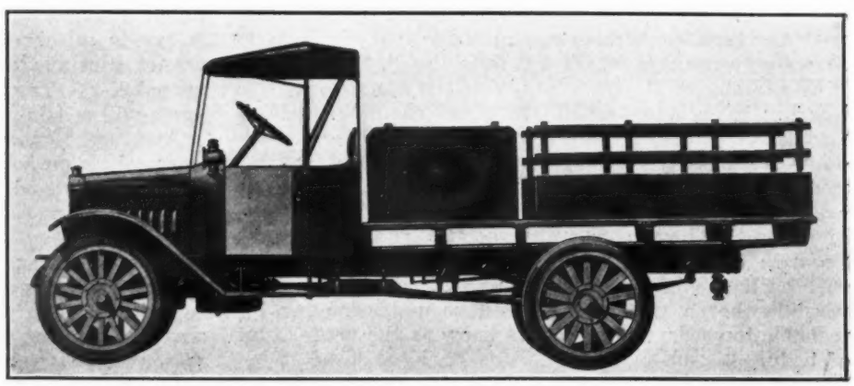
Machinery in New Harroun Plant

MOST of the machinery is in the assembly department of the new plant of the Harroun Motors Corp. at Wayne, Mich. Engines are already running through production. The accompanying photograph was taken by a representative of THE AUTOMOBILE and shows a quantity of the machinery in position.

The plant is T-shaped, with the manufacturing section forming the top of the T and the assembly section forming the stem. The assembly section is now complete, the floors having just been laid.

Bethlehem 1¼ Ton Model

AT the right is illustrated the 1¼-ton truck built by the Bethlehem Motors Corp., Allentown, Pa., fitted with one of several standard body types. The company also builds a 2¼-ton model. Both vehicles are conventional in design and are assembled from standard components. The 1¼-ton model has a 126-in. wheelbase and a 3¾ by 4¼ in. G. B. & S. engine. It uses 34 by 3 in. tires in front and 34 by 4 in. tires in the rear.



Fan Is Important Cooling Factor—II

Radiators Offer Largest Variety of Selection—Frontal Area Should Be a Maximum—Air As a Cooling Agent

By A. K. Schanze
Pitter Fan Co.

Second installment of a paper read by Mr. Schanze before the Cleveland Section of the S. A. E.

RADIATORS offer about the largest variety of selection in the automobile industry. For anyone to write a comprehensive treatise on the subject would be a life work.

The elements to be looked for from the radiator builder's point of view are numerous, but the engineer whose function it is to select the proper article for his car can be guided by a few details.

After the car architect has established the shape and the purchasing agent has fixed the cost limit, the designing engineer may go as far as he chooses. Frontal area should be a maximum and upon this follows net radiating area.

Radiating area can be reduced to a horsepower basis, as the act of radiating is exactly the process of doing work. Of the total heat of the engine absorbed by the water, we have only to deal with the small residue that would cause overheating if not carried off by the radiator.

The whole thing can be based upon the premise that a cubic foot of air, in passing through a radiator and being raised 50 deg. Fahr. in temperature, has absorbed 1 B.t.u. A horsepower represents 33,400 B.t.u. and upon this basis we can arrive at the other results.

The radiator whose heat transferring qualities are such as to give a uniform rise of temperature to all air passing through it regardless of the velocity of the air is an ideal radiator and it is not beyond our reach. Some are in existence that so closely approach this condition as to be considered perfect to all practical intents and purposes. This may seem a bit at variance with some statements made further along under the subject of fans, but a study of the case will convince that the statements are correctly related.

Air Passages Should Be Free

For efficiency, not only is it necessary to have the air passages free from solder obstructions but it is just as important that they be of a size and shape that will give a good smooth run to the air. The more air that can be passed through a radiator the more will be its cooling power.

We have also to take a careful look at the inside of a radiator to determine its freedom of water circulation and its capacity. On several occasions tests have shown that capillarity was preventing free circulation. This condition of course, is too well known to radiator designers to need comment, but the fault does occur occasionally and is probably due to workmanship more than design.

Core depths as much as 4 in. are in common use and have their purpose. Since expense is increased with core depth it is well to regard the radiator and fan together, as the power of the fan will make a large difference in the core depth. Just what conclusions to draw on this phase of the subject the writer is at a loss to know. It would seem that a 4-in. core was too deep for greatest efficiency and this has at various times proved to be the case. Yet upon some tests conducted on two different makes of radiators with each make the 3⅞-in. core proved of more capacity than the 3⅜-in. core.

As a practical suggestion to car builders the writer offers that every purchaser be furnished a special card cautioning him to keep the exterior of the radiator clean as he possibly can. Much heating complaint would be avoided if radiators were kept clean. Tests go to prove that when a film of oil gathers enough road dust the radiator efficiency is reduced to about one-quarter normal.

Our last element in the discussion of the cooling system will be the fan.

Altogether too little importance has been attached to this unit as is well illustrated by the fact that so few engineers know precisely how the relative values of different fans are determined.

Researches made by some of the foremost radiator manufacturers have shown that cooling varies directly with the quantity of air passed through the radiator, when other conditions are reduced to uniformity. It has, therefore, been the long time hope of many of the radiator manufacturers to see an improvement made in fans.

Experiments conducted by the writer have confirmed the theory that cooling varies directly with the air quantity drawn through a radiator, and some of the records of those tests are incorporated as a part of this paper.

Incidentally, similar experiments have shown that the temperature of the water in a radiator fluctuates practically, degree for degree, with the temperature of the air entering the radiator.

Air As a Cooling Agent

It has been our experience upon some few occasions to meet engineers who stated that they placed little stress upon the value of air as a cooling agent except within very wide latitude. That is to say, they were apparently of the belief that it took a large increase in air delivery, say three or four hundred per cent, to make any noticeable improvement in the cooling apparatus as a whole.

In contravention to this argument it need simply be pointed out that a certain time honored practice among some engine builders is a mute proof that the contrary is the case. When engines are placed upon the dynamometers to be "run in" they are usually connected with their standard radiators and carry their regular fans. Experience showed, in some cases, that this did not provide sufficient cooling to make safe running, so the simple expedient of placing an electric fan on a bench in front of the radiator and directing its air current into the radiator is resorted to with satisfactory results.

On the whole, however, the fan is the last item in the make-up of a car to be considered and it usually shows it.

First and foremost, in the selection of a fan, should be considered the element of quantity of air delivery. The ideal radiator, as has been stated, is the one that will give off its heat at such a rate that the air that passes out of it can absorb no further heat units. In combination with this radiator, the ideal fan is the one which will draw air through the radiator at such a high velocity that the air undergoes no measurable increase in temperature as it passes through.

At first glance it would seem as though this statement of the case partook of the old school day problem of the irresistible force striking the immovable body, but closer inspection will reveal the fact that it is not quite that way.

The fan is the only link in the chain that can be made of practically unlimited power without throwing the system out of balance. Incidentally, it may be remarked that fan manufacturers have the world still to conquer in that respect.

The rate of heat transmission from one medium to another is directly proportional to the difference in the temperatures between the two mediums. This rule applies exactly between

all the variations met with in automobile practice. Therefore, the efficiency of a radiator and fan system combined would be greatest when the mean temperature of the air passing through the radiator were lowest; or, in other words, when the difference in temperature of the water in the radiator and the air passing through it were greatest.

As an illustration, assume the case of a radiator on a summer day with atmospheric temperature at 85 deg. Fahr., mean water temperature 200 deg., and a rise in temperature of air passing through the radiator of 50 deg. The mean air temperature through the radiator is, therefore, 85 deg. $+\frac{50^\circ}{2} = 110$ deg. and the differential between the water and air is 90 deg. Heat will be transmitted in its proper ratio to a differential of 90 deg.

Take then the case where all other conditions are the same as in the foregoing case, but increase the air velocity 40 per cent and thereby reduce the temperature rise from 50 deg. to 30 deg. The mean air temperature through the radiator then is 85 deg. $+\frac{30^\circ}{2} = 100$ deg. and the differential becomes 100 deg. Heat will be transmitted at a faster rate in the proportion of $\frac{100}{90}$ or an increase of 11 per cent.

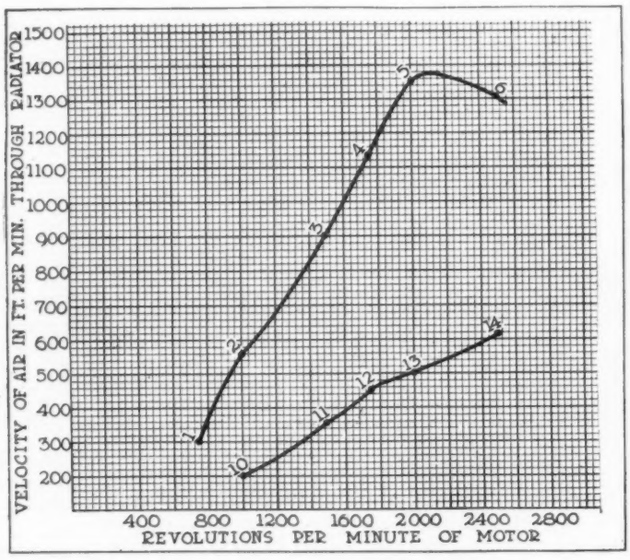
The foregoing will serve the double purpose of illustrating that the fan has a certain definite value, and demonstrating that because a fan may have double the capacity of another it cannot follow that a 100 per cent increase in the motor load capacity can be looked for.

As a matter of practice, then, the rule can be set down that the fan is of vital importance and that the very best fan obtainable should be installed. The question that follows is, what is the best fan obtainable? In answer to this it may be stated briefly that the fan that, on any limit of diameter, will give the maximum air velocity per revolution is best.

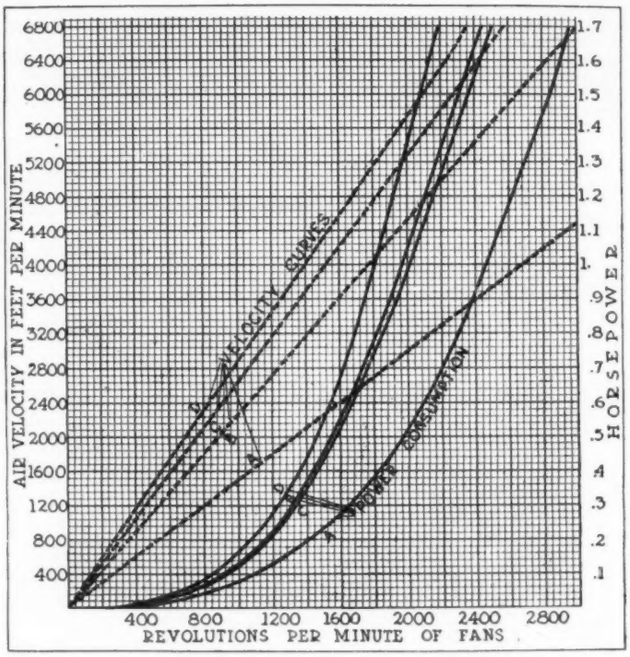
Air velocity depends upon a fan's ability to build up pressure and pressure overcomes the normal friction in the radiator and drives the air through at a velocity proportional to the square root of the pressure.

Fans of any one design increase their capacities in an approximate geometric progression with the increase in diameter. Best practice would therefore suggest the use of the largest diameter possible on any particular model of car.

There are several distinct types of fans offered by the various manufacturers, classified for description as follows: rim fans, which are those whose periphery is bound by a circular rim; flat blade fans, which are usually of three or four



Air velocity curves of 16-in. fans illustrating effect of belt slip—A=16-in., three-arm multiblade; B=IT-Two blade (curved blades)



Power and velocity curves of free air tests of 18-in. fans—A=Four-blade fan (flat blades); B=Three-arm multiblade; C=Five-arm multiblade (special); D=Five-arm multiblade (standard)

flat blades built out from a central spider; curved blade fans, which are similar in construction to the flat blade fans except that the blades are curved somewhat after the manner of a garden trowel; and multiblade fans, which are of two or more arms, up to six, and in which each arm consists of two or more blades.

Taking them in the order named, we note two types of rim fans, viz., those having a very thin rim almost like a wire and those having a broad rim equal in width to the sweep clearance of the blades. In the former type, as nearly as the writer can ascertain, the rim is supposed to add strength both in the resistance to centrifugal force and in the resistance to bending. It is also intended somewhat to act as a safeguard to the radiator should the fan become bent or out of line and strike the radiator.

The writer has conducted air delivery tests extensively on both types of fans and has found them very inefficient.

Flat blade fans are the most common in use at the present day. They are usually of the four blade type built up on a central spider. Their air delivering qualities are not good at low speeds, say at a peripheral speed less than 5000 ft. per min.; hence they have to be run at very high speeds. High speed fans are noisy and consume a large amount of power. These two factors will be discussed later in this paper. It is safe to say that the flat blade fans are very efficient when working at peripheral speeds in excess of 15,000 ft. per min., which, for 16 and 18-in. fans, is close to 3000 r.p.m.

Curved blade fans, as a class, are similar in their construction to flat blade fans; that is to say, they are normally built up on a central spider and are of three or four blade design, generally. In capacity, and efficiency, they are much ahead of the flat blade and rim fans, for automobile uses. Of course, they do not show a constantly increasing efficiency at very high speeds, 4000 and 5000 r.p.m., but then good engineering practice would counsel against the use of any such fan speeds where it were possible at all to get away from it. These fans are good because their efficient speeds are generally comparatively low.

Of the multiblade type of fan there is only one such make at present in existence. This consists of groups of blades placed one behind the other and presenting somewhat the appearance of two fans upon a single hub. Experiment has demonstrated that this is far and away the most powerful and efficient type of disk fan yet produced. The capacity is from 50 to 100 per cent greater than that of other types and its

most efficient speed is down around 800 to 1200 r.p.m. for 16 to 20-in. diameters. It develops a high velocity pressure which drags air through the radiator even under adverse conditions. Its power consumption per cubic foot of air handled is at least 40 per cent less than that of any other type of automobile fan it has been the writer's experience to test. It also has another quality that recommends itself to the automobile engineer, namely, it develops a high peripheral suction around an area about one-third its diameter. It will therefore be noted that it is decidedly centripedal and not centrifugal. This quality brings the edges and corners of a radiator into use. The advantages of this feature are self-evident.

Another type of fan very little used in the automobile industry, but worthy of notice in a paper of this kind, is the centrifugal fan. This is a fan that takes air through the line of its axis and discharges it in the plane of its perimeter. It develops a very high pressure, but is of comparatively low volumetric capacity. On air cooled cars it has been found very satisfactory but its adaptability to water cooled systems remains to be worked out if it ever can.

Power Consumption and Fan Speed

The engineer, in making his selection of a fan, should take into serious consideration the amount of power necessary to handle maximum air velocities through the radiator. The author feels confident in making the statement that this phase of the question has been considered by very few engineers. A study of the power curves shown herewith will show that an astonishing amount of power can be used by a fan when its speeds are excessive.

Take for example the 18-in. fans whose powers, speeds and air delivery are plotted. At 1000 r.p.m., the flat blade fan was delivering a velocity of 1423 ft. per minute on a power consumption of 0.077 hp., in free air.

The multiblade (five-arm) fan, at 1000 r.p.m. was delivering a velocity of 2580 ft. per minute on a power consumption of 0.18 hp. under the same conditions.

Now compare the above with what took place at double the speed, (2000 r.p.m.) The flat blade fan handled air at 2826 ft. per minute velocity and consumed 0.524 hp., and the multiblade fan generated a velocity of 6060 ft. per minute and consumed 1.4 hp.

The increase in power, it will be noted, was almost in direct proportion to the cube of the speeds.

Since many motors are so geared that the fans at times are supposed to be making as much as 4500 r.p.m. it will be seen that at such a pace the power consumption, theoretically, gets up to 6 or 8 hp. It is the writer's basic contention that such a power expended on driving a fan is so completely wrong that its practice should be discontinued without delay. Motors running up steep hills or through heavy roads are frequently shifted into low gear in order to let the cylinders do the work possible at high piston speed. Under such circumstances, then, the fan is demanding one-sixth to one-eighth of the motor's power. These 6 or 8 hp. generate their quota of heat which again has to be extracted. It is a good fan which will assume this additional burden without allowing boiling.

In looking at the situation from a practical standpoint we must investigate the medium through which this high power reaches the fan. This transmission is usually through a belt, either flat or V. Can a leather or canvas belt, whose contact width is between ¾ and 1¼ in., transmit much over 3 hp.? The best authorities on the subject say it cannot be done. This answer is probably correct.

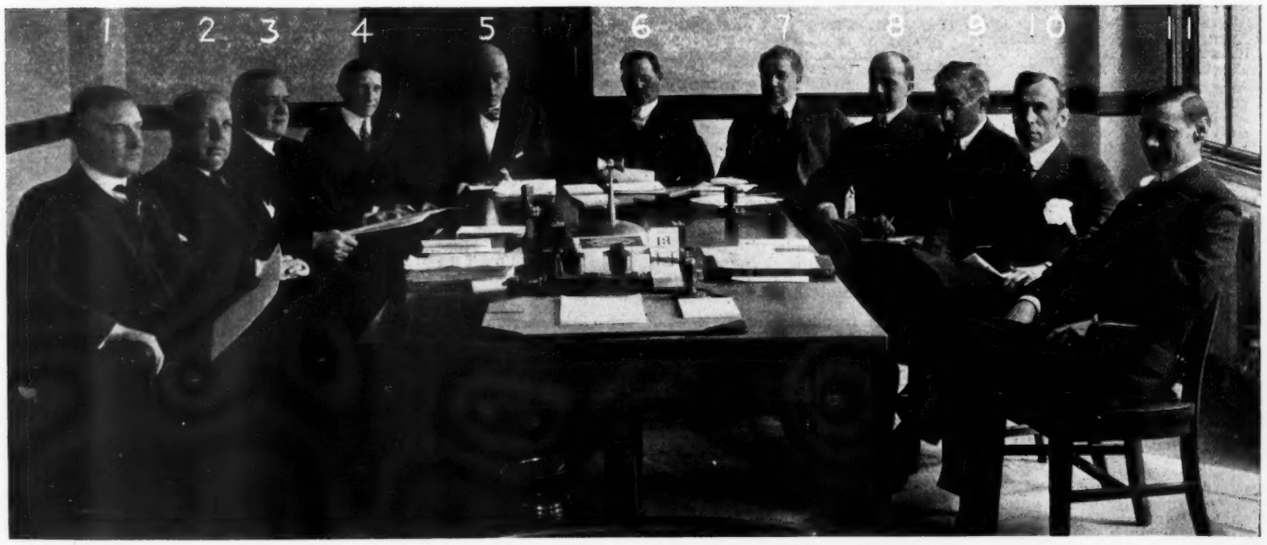
The summary of the whole situation then is that, when the motor gets beyond a certain speed limit, such that the fan should begin to make from 4000 r.p.m. up, the belt begins to slip, and once this condition has set in the fan becomes worse than useless for that particular set of conditions. A slipping belt does itself a lot of harm in addition to polishing the fan pulley so as to make the slip at normal speeds greater.

Fans Not Correctly Connected

The reason for going into this branch of the subject so extensively is because there are several hundred thousand cars built annually in which fans are so connected as to develop a speed of from 2000 to 2500 r.p.m. when the car speed is 20 m.p.h. over the ground. These cars, most of them, do not show a heating tendency over smooth roads at that speed, but do when making from 30 to 40 m.p.h. or when the motor is doing the same amount of work in one of the low gears. Then, at just the right time when the cooling agents are most in demand, the fan is either slipping or using an amount of power not at all commensurate with its cooling power.

(To be continued)

Board of Directors of the Motor and Accessory Manufacturers



1—W. O. Rutherford, general sales manager B. F. Goodrich Co. 2—E. H. Broadwell, vice-president Fisk Rubber Co. and second vice-president M. & A. M. 3—T. J. Wetzel. Precision Die Castings Co. and third vice-president M. & A. M. 4—L. M. Wainwright, president Diamond Chain & Mfg. Co. and treasurer M. & A. M.. 5—James H. Foster, president Hydraulic Pressed Steel Co. and ex-president M. & A. M. 6—C. W. Stiger, president Stromberg Motor Devices Co. and president M. & A. M. 7—Charles E. Thompson, president Steel Products Co. and first vice-president M. & A. M. 8—William M. Sweet, vice-president Klaxon Co. and former manager M. & A. M. 9—Christian Girl, president Standard Parts Co. 10—Alfred P. Sloan, Jr., president Hyatt Roller Bearing Co. and United Motors Corp. and secretary and assistant treasurer M. & A. M. 11—L. M. Bradley, general manager M. & A. M.

Automobile Calendar

ASSOCIATIONS AND CLUBS

May 25—Cleveland, American Automobile Assn., Annual Meeting, Hotel Hollenden.
June 4-6—Hot Springs, Va., National Assn. of Automobile Accessory Jobbers, Convention.
Sept. 12-14—Atlantic City, N. J., Motor and Accessory Manufacturers, Mid - Season Meeting.
Sept. 25-28—Pittsburgh, National Assn. of Purchasing Agents, Convention.

CONTESTS
1917

May 10—Uniontown, Pa., Speedway Race.
May 19—New York Metropolitan Race on Sheepshead Bay Speedway.
May 30—Cincinnati, Ohio. 250-Mile Race.
May 30—Uniontown, Pa., Local Races.
June 9—Chicago, Ill., Speedway Race.
June 23 — Cincinnati, Ohio, Speedway Race.
July 4—Omaha, Neb., Speedway Race, Championship.
July 4—Uniontown, Pa., Speedway Race.
July 4—Tacoma, Wash., Speedway Race.
July 4—Visalia, Cal., Road Race
July 4—Spokane, Wash., Track Race.
July 4—Benton Harbor, Mich., Track Race.
July 14—Rochester, N. Y., Hillclimb.
July 15—Missoula, Mont., Track Race.
July 17-19—Buffalo, N. Y., Intercity Reliability.
July 22—Anaconda, Mont., Track Race.
July 29—Great Falls, Mont., Track Race.
Aug. 5—Billings, Mont., Track Race.
Aug. 17—Flemington, N. J., Track Race.
Sept. 3—Uniontown, Pa., Speedway Race.
Sept. 3—Cincinnati, O., Speedway Race, Championship.
Sept. 6—Red Bank, N. J., Track Race.
Sept. 8—Hillclimb, Pike's Peak, for stripped stock chassis.
Sept. 15—Providence, R. I., Speedway Race, Championship.
Sept. 22—Allentown, Pa., Track Race.
Sept. 28—Trenton, N. J., Track Race.
Sept. 29—New York Speedway Race, Championship.
Oct. 6—Danbury, Conn., Track Race.
Oct. 6—Uniontown, Pa., Speedway Race.
Oct. 13—Richmond, Va., Track Race.
Oct. 13—Chicago Speedway Race, Championship.
Oct. 27 — New York Speedway Race.

SHOWS

May 5-13—Chicago, Used Car Show, Coliseum, Chicago Automobile Trade Assn.
June 20-27 — Montreal, Que., Used Car Show, Coliseum, Montreal Automobile Trade Assn.
Aug. 6-18—Fremont, Neb., General Tractor Demonstration.
Sept. 2-9—Spokane, Wash., Interstate Fair.
Sept. 9-15 — Milwaukee Show, State Park Fair, West Allis.
Sept. 9-15 — Milwaukee, Wis., Fall Show, Wisconsin State Fair, West Allis, Milwaukee Automobile Dealers.
Oct. 13-28—Dallas, Tex., Dallas Automobile & Accessory Dealers' Assn. State Fair.

S. A. E. Calendar

Midsummer Meeting

June 25-26—Washington, D. C.

Standards Division Meetings

MAY

4—Electric Vehicle, Hotel Statler, Cleveland.
4—Marine Standards, Hotel Statler, Cleveland.
16—Ball and Roller Bearing, New York.
18—Truck Standards, New York.
22—Lighting, Cleveland.
25—Aeronautic, New York.
25—Miscellaneous, Detroit.
29—Research, New York.

JUNE

5—Starting Battery, Detroit.
7—Engine, Detroit.
8—Transmission, Detroit.
14—Electric Vehicle, New York.
18—Standards Committee.

Section Meetings

MAY

11—Detroit.
17—Metropolitan, Engines that Will Burn the Fuels We Shall Have to Use. Papers by H. G. Chatain on the Diesel and P. O. Scott on the Junker.
18 — Cleveland. Some New Phases in the Case Hardening of Steel, by J. H. Herron.
25—Indiana.

Engineering Calendar

American Railway Master Mechanics' Assn.
American Institute of Electrical Engineers.
Master Builders' Assn.
American Society of Heating and Ventilating Engineers.
Association Iron and Steel Electrical Engineers.
Mining and Metallurgical Society of America.
Society of Automobile Engineers.
Illuminating Engineering Society.
National Electric Light Assn.
National Gas Engine Assn.
American Society for Testing Materials.
American Institute of Metals.
American Foundrymen's Assn.
Society Naval Architects and Marine Engineers.

MAY

5—Assn. Iron & Steel Elec. Engrs., Majestic Hotel, Philadelphia. Some Recent Applications of Electricity in the Steel Industry by G. E. Stoltz.
8—Soc. for Elec. Development annual meeting.
12—Assn. Iron & Steel Elec. Engrs. monthly meeting Cleveland section.
14—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Mich. section at Detroit.
15—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Mass. section at Boston.
17—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Penna. section at Phila.
17—Mining & Met. Soc. of Amer. monthly meeting New York section at Engrs. Club.
18—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Ohio section at Cleveland.
19—Assn. Iron & Steel Elec. Engrs., Fort Pitt Hotel, Pittsburgh. Auspices of Power Committee, W. O. Oschmann, chairman. Power Cost Accounting Systems as Practised by Several Steel Mills in Pittsburgh District.
21—Amer. Soc. Heat. & Vent. Engrs. monthly meeting New York section.
21-24—Amer. Soc. Mech. Engrs. Spring meeting in Cincinnati. Joint session May 22 with Nat. Mach. Tool Bldrs. Assn.
29-June 1 — Nat. Elec. Light Assn. Convention at Atlantic City.

JUNE

2—Assn. Iron & Steel Elec. Engrs. monthly meeting Phila. section.
5-7—Nat. Gas Engine Assn. annual meeting at Chicago (Sherman House).
8—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Ohio section at Cleveland.
9—Assn. Iron & Steel Elec. Engrs. monthly meeting Cleveland section.
11—Amer. Soc. Heat & Vent. Engrs. monthly meeting Ill. section at Chicago.
11—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Michigan section at Detroit.
12—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Mass. section at Boston.
13-14-15 — Amer. Ry. Master Mech. Assn. convention, Greek Temple, Atlantic City, N. J. Hdqrs. Marlborough-Blenheim Hotel.
14—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Penn. section at Phila.
15—Illum. Eng. Soc. Pittsburgh section, Office Building, Lighting and Inspection Trip through City and County Building. Mr. S. G. Hibben.
16—Assn. Iron & Steel Elec. Engrs. monthly meeting Pittsburgh section.
18-19-20 — Master Car Bldrs. Assn. convention, Greek Temple, Atlantic City, N. J. Hdqrs. Marlborough-Blenheim Hotel.
20-22—Amer. Inst. Chem. Engrs., Ninth Semi-Annual Meeting at Buffalo.
21—Mining & Met. Soc. of Amer. New York section monthly meeting at Engrs. Club.
26-30—Amer. Soc. for Test Mat. annual meeting Atlantic City.

JULY

7—Assn. Iron & Steel Elec. Engrs. monthly meeting Phila. section.
9—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Ill. section at Chicago.
9—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Mich. section at Detroit.
10—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Mass. section at Boston.
12—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Penn. section at Phila.
13—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Ohio section at Cleveland.
14—Assn. Iron & Steel Elec. Engrs. monthly meeting Cleveland section.
16—Amer. Soc. Heat. & Vent. Engrs. monthly meeting New York section.
21—Assn. Iron & Steel Elec. Engrs. monthly meeting Pittsburgh section.

AUGUST

4—Assn. Iron & Steel Elec. Engrs. monthly meeting Phila. section.
9—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Penn. section at Phila.
10—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Ohio section at Cleveland.
11—Assn. Iron & Steel Elec. Engrs. monthly meeting Cleveland section.
13—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Ill. section at Chicago.
13—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Mich. section at Detroit.
14—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Mass. section at Boston.
20—Amer. Soc. Heat. & Vent. Engrs. monthly meeting New York section.
21—Assn. Iron & Steel Elec. Engrs. monthly meeting Pittsburgh section.

SEPTEMBER

1—Assn. Iron & Steel Elec. Engrs. monthly meeting Phila. section.
8—Assn. Iron & Steel Elec. Engrs. monthly meeting Cleveland section.
10-14—Assn. Iron & Steel Elec. Engrs. annual convention at Phila.
10—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Ill. section at Chicago.
10—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Mich. section at Detroit.
11—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Mass. section at Boston.
13—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Penn. section at Phila.
14—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Ohio section at Cleveland.
15—Assn. Iron & Steel Elec. Engrs. monthly meeting Pittsburgh section.
17—Amer. Soc. Heat. & Vent. Engrs. monthly meeting New York section.
20—Mining & Met. Soc. of Amer. monthly meeting N. Y. section at Engrs. Club.
24—Amer. Inst. Metals at Boston.
24—Amer. Fdry. Assn. annual meeting at Boston.

OCTOBER

6—Assn. Iron & Steel Elec. Engrs. monthly meeting Phila. section.
8—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Ill. section at Chicago.
9—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Mich. section at Detroit.
10—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Mass. section at Boston.
11—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Penn. section at Phila.
13—Assn. Iron & Steel Elec. Engrs. monthly meeting Cleveland section.
15—Amer. Soc. Heat. & Vent. Engrs. monthly meeting New York section.
17, 18, 19—Amer. Gas. Inst. at Washington, D. C.